

**STATE OF ARIZONA  
SIGNIFICANT AMENDMENT TO  
AQUIFER PROTECTION PERMIT NO. P- 100525  
PLACE ID 9676, LTF 58677**

**1.0 AUTHORIZATION**

In compliance with the provisions of Arizona Revised Statutes (A.R.S.) Title 49, Chapter 2, Articles 1, 2 and 3 and Chapter 4, Arizona Administrative Code (A.A.C.) Title 18, Chapter 9, Articles 1 and 2, A. A. C. Title 18, Chapter 11, Article 4 and amendments thereto, and the conditions set forth in this permit, ASARCO LLC is hereby authorized to operate the ASARCO Ray Operations located near Kearney, Pinal County Arizona, over groundwater of the Mineral Creek/Salt River Basin, in Sections 34 and 35, Township 2 South, Range 13 East, and Sections 1-4, 9-16, 22-26, 35 and 36, Township 3 South, Range 13 East, and Sections 18, 19, 29, 30, and 31, Township 3 South, Range 14 East of the Gila and Salt River Base Line and Meridian.

This amendment replaces the original permits and becomes effective on the date of the Water Quality Division Director's signature and shall be valid for the life of the facility (operational, closure, and post-closure periods), unless suspended or revoked pursuant to A.A.C. R18-9-A213. The permittee shall construct, operate and maintain the permitted facilities:

1. Following all the conditions of this permit including the design and operational information documented or referenced below, and
2. Such that Aquifer Water Quality Standards (AWQS) are not violated at the applicable point(s) of compliance (POC) set forth below, or if an AWQS for a pollutant has been exceeded in an aquifer at the time of permit issuance, that no additional degradation of the aquifer relative to that pollutant, and as determined at the applicable POC, occurs as a result of the discharge from the facility.

**1.1 Permittee Information**

**Facility Name:** ASARCO Ray Operations

**Facility Address:** State Highway 177  
Near Kearney, Pinal County, Arizona

**Permittee:** ASARCO LLC  
**Permittee Address:** ASARCO LLC – Ray Complex  
Box 8  
Hayden, Arizona 85235

**Facility Contact:** General Manager

**Emergency Phone No.:** 520-356-2333

**Latitude/Longitude:** 33°09'18" N / 110° 58' 56" W

**Legal Description:** Sections 34 and 35, Township 2 South, Range 13 East; and Sections 1-4, 9-16, 22-26, 35, and 36 Township 3 South, Range 13 East; and Sections 18, 19, 29, 30, 31, and 32 Township 3 South, Range 14 East of the Gila and Salt River Base Line and Meridian.

**1.2 Authorizing Signature**

\_\_\_\_\_  
**Michael A. Fulton, Director**  
**Water Quality Division**  
**Arizona Department of Environmental Quality**  
Signed this \_\_\_\_ day of \_\_\_\_\_, 2014

\_\_\_\_\_  
**Laura L. Malone, Director**  
**Waste Programs Division**  
**Arizona Department of Environmental Quality**  
Signed this \_\_\_\_ day of \_\_\_\_\_, 2014

**THIS AMENDMENT SUPERSEDES THE PREVIOUS PERMITS**

DRAFT

<b>1.0</b>	<b>AUTHORIZATION</b>	<b>1</b>
1.1	Permittee Information	1
1.2	Authorizing Signature	1
<b>2.0</b>	<b>SPECIFIC CONDITIONS</b>	<b>54</b>
2.1	Facility / Site Description	54
2.2	Best Available Demonstrated Control Technology	1341
2.2.1	Engineering Design	1341
2.2.2	Site-specific Characteristics	1341
2.2.3	Pre-operational Requirements	1342
2.2.4	Operational Requirements	1342
2.3	Discharge Limitations	1342
2.3.1	Rock Deposition Areas (RDAs)	1442
2.3.2	Pregnant Leach Solution (PLS) Ponds and Impoundments	1442
2.3.3	Non-Stormwater Impoundments	1443
2.4	Point(s) of Compliance	1543
2.5	Monitoring Requirements	1544
2.5.1	Discharge Monitoring	1544
2.5.2	Facility / Operational Monitoring	1544
2.5.3	Groundwater Monitoring and Sampling Protocols	1644
2.5.4	Surface Water Monitoring and Sampling Protocols	1745
2.5.5	Analytical Methodology	1746
2.5.6	Installation and Maintenance of Monitoring Equipment	16
2.5.7	Compliance Groundwater Quality Monitoring for POC and AL Wells	16
2.5.8	Passive Containment Demonstration	16
2.6	Contingency Plan Requirements	1847
2.6.1	General Contingency Plan Requirements	1847
2.6.2	Exceeding of Alert Levels	1947
2.6.3	Discharge Limitations Violations	2149
2.6.4	Aquifer Quality Limit Violation	2324
2.6.5	Emergency Response and Contingency Requirements for Unauthorized Discharges	2422
2.6.6	Corrective Actions	2423
2.7	Reporting and Recordkeeping Requirements	2523
2.7.1	Self-monitoring Report Form	2523
2.7.2	Operation Inspection / Log Book Recordkeeping	2523
2.7.3	Permit Violation and Alert Level Status Reporting	2624
2.7.4	Operational, Other or Miscellaneous Reporting	2624
2.7.5	Reporting Location	2624
2.7.6	Reporting Deadline	2725
2.7.7	Changes to Facility Information in Section 1.0	2725
2.8	Temporary Cessation	2725
2.9	Closure	2726
2.9.1	Closure Plan	2826
2.9.2	Closure Completion	2826
2.10	Post-closure	2826
2.10.1	Post-closure Plan	2826
2.10.2	Post-closure Completion	2827
<b>3.0</b>	<b>COMPLIANCE SCHEDULE</b>	<b>2928</b>
<b>4.0</b>	<b>TABLES OF MONITORING REQUIREMENTS</b>	<b>31</b>
4.1	Facility List	31
4.2	Compliance (Or Operational) Monitoring	31
<b>5.0</b>	<b>REFERENCES AND PERTINENT INFORMATION</b>	<b>6564</b>
<b>6.0</b>	<b>NOTIFICATION PROVISIONS</b>	<b>6665</b>

6.1	Annual Registration Fees .....	<del>6665</del>
6.2	Duty to Comply .....	<del>6665</del>
6.3	Duty to Provide Information .....	<del>6665</del>
6.4	Compliance with Aquifer Water Quality Standards .....	<del>6665</del>
6.5	Technical and Financial Capability .....	<del>6665</del>
6.6	Reporting of Bankruptcy or Environmental Enforcement .....	<del>6665</del>
6.7	Monitoring and Records .....	<del>6665</del>
6.8	Inspection and Entry .....	<del>6665</del>
6.9	Duty to Modify .....	<del>6766</del>
6.10	Permit Action: Amendment, Transfer, Suspension & Revocation .....	<del>6766</del>
7.0	ADDITIONAL PERMIT CONDITIONS .....	<del>6766</del>
7.1	Other Information .....	<del>6766</del>
7.2	Severability .....	<del>6766</del>
7.3	Permit Transfer .....	<del>6766</del>

## 2.0 SPECIFIC CONDITIONS

[A.R.S. §§ 49-203(4), 49-241(A)]

### 2.1 Facility / Site Description

[A.R.S. § 49-243(K)(8)]

The ASARCO Ray Operations are located in eastern Pinal County, along State Highway 177, approximately ten miles to the north of Kearny. The site consists of an open-pit mine and associated rock deposition areas (RDAs), a mill that produces concentrate, a solvent extraction-electrowinning (SX-EW) plant that produces refined copper cathodes from the leaching operations, and a tailings facility for deposition of tailings generated during the flotation process at the Ray Concentrator. Underground mining activities began in the area around 1880, and continued off and on until the mid-1940's. The Ray Mine has been in operation since 1911. In 1948 the Kennecott Copper Company consolidated the remaining mining operations and began the development of the open-pit mine. ASARCO purchased the mine from Kennecott in 1986. The Ray porphyry copper deposit lies within the historical drainage of Mineral Creek, which bisected the deposit until late 1972. The water of the creek was diverted around the mine via an 18,181 foot long man-made diversion tunnel, which was driven into the Dripping Springs Mountain Range located to the east of the mine. A 13,300 foot extension of the diversion tunnel was completed in 2002, to better isolate the waters of Mineral Creek from mining, milling, and leaching operations.

Mining operations are ongoing, 24 hours a day, seven days a week, and progress through a sequence involving drilling, blasting, loading and hauling activities. The current mining rate from the open pit averages about 256,000 tons of ore and waste rock per day with a copper sulfide ore milling capacity at approximately 60,000 tons per day. Based upon the current mining rate and the estimated ore reserves, the Ray operations will be active until the year 2044.

The copper sulfide ores mined at the Ray Mine are taken to one of two crushing facilities on-site, and then conveyed to the Ray Concentrator or railed off-site to the Hayden Concentrator for processing prior to shipment to a smelter. The remaining material consists of leach rock material and barren rock. The leach rock material is taken to prepared RDAs and leached, and barren rock is hauled to separate RDAs where no leaching presently occurs.

The RDAs are typically constructed by end-dumping ore from trucks in 25 to 100 foot lifts. Ultimate RDA thicknesses may exceed 1,000 feet. Leach solution or raffinate is applied to the RDAs by flooding bermed cells on top of the RDAs; or spraying, trickling, or dripping solution onto the top of the RDAs. Solution can also occasionally be applied to an RDA face. Leach solution percolates through the RDA, reacting with the copper bearing ores, and ultimately flows out the toe of the RDA as pregnant leach solution (PLS). The PLS is captured by a downgradient collection system, typically an impoundment, and piped to the SX-EW Plant for the production of refined copper cathodes.

Operational facilities, such as ditches and catchments, convey process fluids through permitted RDAs. These facilities are transient in nature as they typically occur in low points within an RDA where raffinate and PLS pool before ultimately reporting to the final impoundment for processing. The facilities typically have variable liquid levels based on evaporation rates, impoundment elevation, rock placement, and raffinate application rates. The facilities may contain stormwater, process contact water, PLS, raffinate, or any combination thereof. ASARCO refers to these facilities as Dynamic Solution Management Facilities (DSMFs). These facilities exist only on permitted RDAs.

The facilities at the Ray Mine are identified by association with one of three hydrologic sub-areas based on groundwater and surface water flow characteristics.

Subarea A is defined as the portion of the mine upgradient of the open pit-induced hydrologic sink. The area is drained by Mineral Creek upstream and upgradient of the Ray Operations hydrologic sink and the

inlet of the Mineral Creek Diversion Tunnel. The direction of subflow movement within Subarea A is from the Dripping Spring and Tortilla Mountains toward Mineral Creek, and then downstream along Mineral Creek toward the Ray Operations open-pits in Subarea B.

Subarea B is the portion of the mine influenced by the hydrologic sink. The hydrologic conditions in Subarea B of the Ray Operations consist of essentially a closed hydrologic system. The steep topography and open pit provide hydrologic controls that isolate mine operations and related discharges within Subarea B. The groundwater in Subarea B migrates through the fractured bedrock, along faults and locally through the Holocene Mineral Creek alluvium toward the open pit, and discharges to the surface in the walls and the floor of the pit.

Subarea C is the portion of the mine downgradient of the hydrologic sink. The Ray Mine is located near the Lower San Pedro (groundwater) Basin. The Lower San Pedro Basin area near the Ray Operations is bounded by the Dripping Spring Mountains on the east and the Tortilla Mountains on the west. Groundwater movement is from the eastern and western margins of the basin, toward the basin axis defined by tributaries to Mineral Creek.

The permitted facilities include 8 RDAs (and associated DSMFs); 30 additional primary and secondary process solution impoundments; 6 non-stormwater impoundments, and 2 truck-wash impoundments.

Tables summarizing the permitted facilities, including latitudes and longitudes, are provided in Section 4.1.

This permit authorizes the operation of the following permitted discharging facilities:

#### **Sub Area A Facilities**

##### **2.1.1 4-Series RDA (A4RDA) (Heap Leach Pad)**

This facility is an existing leach facility on the northwest portion of Sub Area A, with a planned approximate final surface area of 780 acres with a permitted height of 3,000 ft. Raffinate is applied to the facility, and pregnant leach solution (PLS) is collected in PLS impoundments at the downgradient leach facility toes, and pumped to the SX/EW Plant. DSMFs convey process fluids through the RDA. The facility is located upgradient from the hydrologic sink and any groundwater flows into the capture zone of the Open Pit passive containment.

##### **2.1.2 9-Series RDA (A9RDA) (Heap Leach Pad)**

This facility is an existing leach facility located on north of the Open Pit, with a planned approximate final surface area of 269 acres with a permitted height of 3,000 ft. Raffinate is applied to the facility, and PLS is collected in PLS impoundments at the downgradient leach facility toes, and pumped to the SX/EW Plant. DSMFs convey process fluids through the RDA. The facility is located upgradient from the hydrologic sink and any groundwater flows into the capture zone of the Open Pit passive containment.

##### **2.1.3 5-Series RDA (A5RDA) (Heap Leach Pad)**

This facility is an existing leach facility on the east side of Mineral Creek, with a planned approximate final surface area of 813 acres with a permitted height of 3,000 ft. Raffinate is applied to the facility, and PLS is collected in PLS impoundments at the downgradient leach facility toes, and pumped to the SX/EW Plant. DSMFs convey process fluids through the RDA. The facility is located upgradient from the hydrologic sink and any groundwater flows into the capture zone of the Open Pit passive containment.

##### **2.1.4 9 North Sump (A27) (Process Solution Impoundment)**

This unlined sump is constructed over bedrock, and receives PLS and stormwater runoff from the 9-Series RDA. It has a maximum storage capacity of approximately 2,264,749 cubic feet (cu ft) (16,941,500 gallons [gal]) and an approximate depth of 20 feet (ft). Stored solution is pumped to the

9-Series RDA. The facility is located upgradient from the hydrologic sink and any groundwater flows into the capture zone of the Open Pit passive containment.

**2.1.5 4F Impoundment (A28) (Process Solution Impoundment)**

This unlined impoundment has an approximate volume of 148,924,237 cu ft (1,114,030,656 gal) and an approximate depth of 188 ft. It is constructed over bedrock and collects mine water from the open Pit. Water is pumped from the impoundment to point of uses via a barge mounted pump. The facility is located upgradient from the hydrologic sink and any groundwater flows into the capture zone of the Open Pit passive containment.

**2.1.6 9 Sump (A4D.3) (Process Solution Impoundment)**

This sump is divided into two impoundments, 9 North and 9 South. These unlined impoundments are constructed on bedrock, and are designed to capture PLS from the 4-, 5-, and 9- Series RDAs. It has a maximum storage capacity of approximately 6,016,000 cu ft (45,002,805 gal) and an approximate depth of 50 ft. Stored solution is pumped to the SX/EW Plant. The facility is located upgradient from the hydrologic sink and any groundwater flows into the capture zone of the Open Pit passive containment.

**Sub Area B Facilities**

**2.1.7 1-Series RDA (B1RDA) (Heap Leach Pad)**

This facility is an existing leach facility located on the west side of the Open Pit, with a planned approximate final surface area of 442 acres with a permitted height of 3,000 ft. Raffinate is applied to the facility, and PLS is collected in PLS impoundments at the downgradient leach facility toes, and pumped to the SX/EW Plant. Tailings from the Belgravia Tailings Storage Facility are placed within the facility. DSMFs convey process fluids through the RDA. The facility is located upgradient from the hydrologic sink and any groundwater flows into the capture zone of the Open Pit passive containment.

**2.1.8 2-Series RDA(B2RDA) (Heap Leach Pad)**

This facility is an existing leach facility located on the west side of the Open Pit, with a planned final approximate surface area of 388 acres with a permitted height of 3,000 ft. Raffinate is applied to the facility, and PLS is collected in PLS impoundments at the downgradient leach facility toes, and pumped to the SX/EW Plant. Tailings from the Belgravia Tailings Storage Facility are placed within the facility. DSMFs convey process fluids through the RDA. The facility is located upgradient from the hydrologic sink and any groundwater flows into the capture zone of the Open Pit passive containment.

**2.1.9 3-Series RDA(B3RDA) (Heap Leach Pad)**

This facility is an existing leach facility located on the west side of the Open Pit, with a planned approximate final surface area of 329 acres with a permitted height of 3,000 ft. Raffinate is applied to the facility, and PLS is collected in PLS impoundments at the downgradient leach facility toes, and pumped to the SX/EW Plant. DSMFs convey process fluids through the RDA. The facility is located upgradient from the hydrologic sink and any groundwater flows into the capture zone of the Open Pit passive containment.

**2.1.10 10 Pond (B33) (Non-Stormwater Impoundment)**

This lined impoundment has an approximate volume of 246,675 cu ft (1,845,256 gal), and an approximate depth of 17 feet. It is constructed on the 4-Series RDA, and collects reclaimed water for dust suppression and other operational needs. The facility is located upgradient from the hydrologic sink and any groundwater flows into the capture zone of the Open Pit passive containment.

**2.1.11 Last Turn Stormwater Diversion Channel (B29) (Non-Stormwater Impoundment)**

This facility is an unlined channel consisting of a series of three impoundments with inter-connecting

conveyances. The overall channel length is approximately 5,000 feet, the approximate volume is 1,611,720 cu ft (12,056,503 gal), and the channel depth ranges from 10-30 feet. It is constructed over bedrock and collects stormwater runoff from the upgradient leach facilities and run off from Highway 177. The facility is located upgradient from the hydrologic sink and any groundwater flows into the capture zone of the Open Pit passive containment.

**2.1.12 1B Dam (Sulfide Sump) (B1B.1) (Process Solution Impoundment)**

This unlined impoundment has an approximate volume of 65,000 cu ft (486,234 gal) and an approximate depth of 16 feet. It is constructed over bedrock, and collects PLS from upgradient leach facilities, which is then pumped to the SX/EW Plant. The facility is located upgradient from the hydrologic sink and any groundwater flows into the capture zone of the Open Pit passive containment.

**2.1.13 Maintenance Area Truck Wash – Light Vehicle (B30.1)**

This concrete wash pad is equipped with a sump that collects fluids from the light duty truck wash. Impounded fluids gravity flow into Big Dome Pond. The facility is located upgradient from the hydrologic sink and any groundwater flows into the capture zone of the Open Pit passive containment.

**2.1.14 Maintenance Area Truck Wash – Heavy Vehicle (B30.2)**

This concrete wash pad is equipped with a sump that collects and recirculates the fluids from the heavy duty truck wash.. In upset conditions impounded fluids gravity flow into Daltons Pond. The facility is located upgradient from the hydrologic sink and any groundwater flows into the capture zone of the Open Pit passive containment.

**2.1.15 1A Dam (B1A.2) (Process Solution Impoundment)**

This unlined impoundment has an approximate volume of 7,800 cu ft (58,348 gal), and an approximate depth of 10 feet. It is constructed over bedrock, and collects PLS from upgradient leach dumps, which is then pumped to the SX/EW Plant. The facility is located upgradient from the hydrologic sink and any groundwater flows into the capture zone of the Open Pit passive containment.

**2.1.16 Concentrator Non-Stormwater pond (B1A.3) (Process Solution Impoundment)**

This shotcrete lined impoundment has an approximate volume of 11,300 cu ft (84,530 gal), and an approximate depth of 6 feet. It is constructed over bedrock, and collects PLS from upgradient leach facilities, which is then pumped to the SX/EW Plant. The facility is located upgradient from the hydrologic sink and any groundwater flows into the capture zone of the Open Pit passive containment.

**2.1.17 PM Bay Sump and Truck Wash (B1A.4) (Process Solution Impoundment)**

This facility is an unlined concrete pad and sump, constructed in the 1-Series RDA. It collects wash down water from haul trucks. The approximate maximum capacity of the sump is 20,000 cu ft (149,610 gal). Co-located at this facility is a heavy vehicle truck wash. The concrete wash pad is equipped with a sump that collects fluids from the truck wash. Impounded fluids overflow to the open pit. The facility is located upgradient from the hydrologic sink and any groundwater flows into the capture zone of the Open Pit passive containment.

**2.1.18 Ray Concentrator Collection Pond (B5) (Process Solution Impoundment)**

This impoundment collects slurry from the Ray Concentrator during maintenance and upset conditions, and stormwater runoff from the warehouse outside laydown yard. It has a 60-mil HDPE liner, and an approximate volume of 124,000 cu ft (927,584 gal) with an approximate depth of 17 feet. Accumulated solutions are pumped to the Ray Concentrator Tailings Sump, Big Dome Pond, or back to the mill. The facility is located upgradient from the hydrologic sink and any groundwater flows into the capture zone of the Open Pit passive containment.

**2.1.19 Dalton's Pond (B4.1) (Process Solution Impoundment)**

This impoundment collects surface runoff from surrounding areas of the property. It is lined with an



80-mil HDPE liner on the downstream face. It has an approximate volume of 326,000 cu ft (2,438,649 gal) with an approximate depth of 50 feet. Accumulated solution is pumped to Big Dome Pond. The facility is located upgradient from the hydrologic sink and any groundwater flows into the capture zone of the Open Pit passive containment.

**2.1.20 Solid Waste Landfill (B3.2)**

The current footprint of the active area of the landfill is 9.3 acres, and is contained within a 50-acre parcel that is covered under a restrictive covenant dated August 30, 2002. At this time, ADEQ requires that the landfill footprint be limited to 9.3 acres in size unless an application for a significant amendment to the APP has been submitted and approved by ADEQ. The landfill accepts only dry, non-hazardous solid waste generated from mine administration, operations, maintenance, and construction activities. The waste consists of general debris such as paper, wood, plastic, rubber, brick, concrete, soil, cardboard, plastic, styrofoam boxes and general packaging, pipe, rags, and limited non-salvageable scrap metal. Up to 16,000 cubic yards of waste per year is deposited into the landfill. Solid waste shall be covered at the end of each day with a minimum of six (6) inches of clean soil.

**2.1.21 Regulated Asbestos Containing Material (RACM) Cell (3B.3)**

The current footprint of the active area of the asbestos landfill is 2.71 acres, and is contained within a 16.3-acre area designated as the regulated asbestos-containing material (RACM) landfill area as shown in Drawing No. 3, *Ray Landfill/Proposed RACM Landfill (Figure III)*, of the March 18, 2009, application. The landfill is regulated under 40 CFR Part 61, subpart M, and is compliant in that emissions are controlled through the timely painting and covering of transite pipe, and the containerization, sealing, and covering (with a minimum of six (6) inches of clean soil) of any other friable and non-friable asbestos-containing wastes.

**Sub Area C Facilities**

**2.1.22 7-Series RDA (C7RDA) (Heap Leach Pad)**

This facility is an existing leach facility located on the west side of Mineral Creek, with a planned approximate final surface area of 537 acres with a permitted height of 3,000 ft. Raffinate is applied to the facility, and PLS is collected in PLS impoundments at the downgradient leach facility toes, and pumped to the SX/EW Plant. DSMFs convey process fluids through the RDA.

**2.1.23 8-Series RDA (C8RDA) (Heap Leach Pad)**

This facility is an existing leach facility located on the east side of Mineral Creek, with a planned approximate final surface area of 744 acres with the northern portion permitted to a height of 3,000 ft. Raffinate is applied to the facility and PLS is collected in PLS and Stacker Dam impoundments at the downgradient leach facility toes, and pumped to the SX/EW Plant. DSMFs convey process fluids through the RDA.

**2.1.24 7A Booster Impoundment (C45) (Process Solution Impoundment)**

This double-lined impoundment has an approximate volume of 66,038 cubic feet (493,962 gallons) and an approximate depth of 12 feet and is equipped with a Leachate Collection and Recovery System (LCRS). The facility collects PLS from the 7-Series RDA and a booster pump station pumps impounded fluids to the SX-EW Plant.

**2.1.25 Suzie D Impoundment (C31) (Process Solution Impoundment)**

The Suzie D Impoundment is an unlined non-storm water impoundment constructed in a natural drainage channel. The Suzie D Impoundment will receive pumped mine water from various sumps located on site. The main source of water will be mine water collected in the bottom of the Amanda Pit. Water stored in Suzie D Impoundment will be pumped via barge mounted pump to desired points, primarily the 8 series RDAs for use in the leaching process.

**2.1.26 Lower Suzie D Impoundment (C7) (Process Solution Impoundment)**

This impoundment receives inflows from stormwater runoff from the 8-Series RDA. It is unlined, with an approximate volume of 29,000 cu ft (216,935 gal), and an approximate depth of 12 feet. Accumulated fluid is pumped to Big Dome Pond. An HDPE overflow pipe transfers overflow to Big Dome Pond.

**2.1.27 7A Dam (C7A.7) (Process Solution Impoundment)**

This unlined impoundment collects PLS from the 7-Series RDA. It has an approximate capacity of 460,000 cu ft (3,441,039 gal), with a depth of 16 feet. Accumulated PLS is pumped to the SX/EW Plant. To avoid overtopping, an HDPE pipe transmits excess fluid by gravity flow to Big Dome Pond.

**2.1.28 Electrowinning Dam (C9) (Process Solution Impoundment)**

This unlined impoundment collects fluid from the wet scrubbers and process areas of the EW Plant. The approximate capacity is 36,000 cu ft (269,299 gal), with a depth of 10 feet. Captured fluids are pumped back into the leach circuit. An HDPE overflow pipe transmits excess fluid by gravity flow to the Lower Slimes Dam.

**2.1.29 8 Series Pond (C3.3) (Process Solution Impoundment)**

This impoundment is excavated into alluvium, and lined by low permeability slimes. It collects PLS from portions of the 8-Series RDA and has an approximate capacity of 73,000 cu ft (546,078 gal), with a depth of 4 feet. Accumulated fluids are pumped to the SX/EW Plant.

**2.1.30 7C Pond (C7C.2) (Process Solution Impoundment)**

This unlined impoundment collects occasional inflows of PLS from the 7-Series RDA. This impoundment collects PLS at the base of the RDA, and percolates along the alluvium/bedrock interface to the 7C Dam. The facility has an approximate capacity of 111,000 cu ft (830,338 gal) with a depth of 30 feet.

**2.1.31 7B Dam(C7B.1) (Process Solution Impoundment)**

This unlined impoundment collects PLS from the 7-Series RDA. It has an approximate capacity of 538,000 cu ft (4,024,519 gal), with a depth of 16 feet. Accumulated PLS is pumped to the SX/EW Plant. To avoid overtopping, an HDPE pipe transmits excess fluid by gravity flow to Big Dome Pond.

**2.1.32 Upper Slimes Pond (C3) (Process Solution Impoundment)**

This impoundment collects PLS from upgradient leach facilities, is constructed over bedrock, and is lined with low permeability slimes from thickener tank residue. The approximate impoundment volume is 375,000,000 cu ft (2,805,194,805 gal), with a depth of approximately 30 feet. Accumulated PLS is pumped to the SX/EW Plant.

**2.1.33 Middle Slimes Dam (C3.2) (Process Solution Impoundment)**

This PLS impoundment is constructed over bedrock, lined with low permeability slimes from thickener tank residue. The approximate impoundment volume is 11,000 cu ft (82,286 gal), with a depth of approximately 5 feet. This impoundment collects PLS seepage from the Upper Slimes Pond. Overflow is gravity fed by HDPE pipe to the Lower Slimes Dam. Accumulated PLS seepage flows by gravity to the SX/EW Plant.

**2.1.34 Middle Slimes Pond (C3.2b) (Process Solution Impoundment)**

This impoundment collects PLS seepage from Upper Slimes Pond. The approximate impoundment capacity is 114,000 cu ft (852,779 gal) with a depth of approximately 12 feet. Overflow from the facility is gravity fed by pipe to the Lower Slimes Dam.

**2.1.35 Lower Slimes Dam (C11) (Process Solution Impoundment)**

This unlined impoundment is constructed over bedrock, and collects PLS from the 8-Series RDA,

Upper and Lower Slimes Ponds, and overflow from the EW and Middle Slimes Dams. The approximate capacity is 209,000 cu ft (1,563,429 gal), with a depth of 22 feet. To prevent overtopping, an HDPE pipe conveys excess solution by gravity feed to Big Dome Pond. Accumulated fluids are pumped to the SX/EW Plant.

**2.1.36 7C Dam (C7C.1) (Process Solution Impoundment)**

This unlined impoundment collects PLS from the 7-Series RDA. It has an approximate capacity of 94,000 cu ft (703,169 gal), with a depth of 16 feet. Accumulated PLS is pumped to the SX/EW Plant. To avoid overtopping, an HDPE pipe transmits excess fluid by gravity flow to Big Dome Pond.

**2.1.37 Big and Little Dome Ponds and Truck Wash (C1) (Process Solution Impoundment)**

These two adjoining impoundments are lined with 80-mil HDPE liners. The approximate capacities are 1,760,000 cu ft (13,165,714 gal) and 353,000 cu ft (2,640,623 gal), with approximate depths of 16 and 12 feet, respectively. The facilities collect sewage treatment plant effluent; stormwater runoff and overflows from the 7-Series Dams, Sulfide Sump, Suzie D Dam, and the Lower Slimes Dam; as well as flows from shop drains, showers, and the metals laboratory. Pumps are installed to transfer fluids to appropriate storage/uses elsewhere. Co-located at the Little Dome Pond is a heavy vehicle truck wash. This concrete wash pad is equipped with a sump that collects fluids from the heavy duty truck wash. Impounded fluids gravity flow into Little Dome Pond.

**2.1.38 7D Dam (C7D.1) (Process Solution Impoundment)**

This unlined impoundment collects PLS from the 7-Series RDA. It has an approximate capacity of 746,000 cu ft (5,580,468 gal), with a depth of 18 feet. Accumulated PLS is pumped to the SX/EW Plant. To avoid overtopping, an HDPE pipe transmits excess fluid by gravity flow to Big Dome Pond.

**2.1.39 7E Raffinate Storage Pond (C34) (Process Solution Impoundment)**

This lined impoundment has an approximate volume of 9,003,933 cu ft (67,354,094 gal), and an approximate depth of 23 feet. This facility collects raffinate for use in the 7-Series RDA. This facility overflows to the Goat Ranch Lined Pond.

**2.1.40 Stacker Dam (C12) (Process Solution Impoundment)**

This unlined impoundment has an approximate capacity of 125,000 cu ft (935,065 gal), with a depth of 11 feet. It collects PLS from the 8-Series RDA. Accumulated PLS is pumped to the SX/EW Plant. An HDPE overflow pipe transmits excess fluid by gravity feed to the Goat Ranch Lined Pond.

**2.1.41 Retention Basin (C35) (Non-Stormwater Impoundment)**

This unlined facility is used to temporarily contain stormwater runoff and unforeseen emergency spills. It has an overall storage volume of 3,354,000 cu ft (25,089,662 gal), with a depth of 25 feet. In addition to a dam and pump-back system, the facility includes a bedrock sump and pumpback system about 50 feet upgradient of the dam, with dedicated 500 gallon per minute (gpm) and 2,000 gpm pumps. Impounded fluids are pumped back into the Ray Pit, Big Dome Pond, or Dalton's Pond.

**2.1.42 Goat Ranch Lined Pond (C20.1) (Process Solution Impoundment)**

This facility is lined using a geosynthetic clay liner. It collects solutions from the Stacker Dam, 7D Dam, and Big Dome Pond, via HDPE overflow pipes. It has an approximate volume of 2,850,000 cu ft (21,319,481 gal), with an average depth of 16 feet. Accumulated fluids are pumped back into the operations cycle.

**2.1.43 Elder Gulch Tailings Facility (C36) (Process Solution Impoundment)**

This facility receives tailings from the Tailings Thickener (C37). HDPE pipes are located throughout the impoundment and convey fluids to lined underdrains at the toe of the facility and convey them to the Seepage Collection Pond (C38). (see AMEC October 25, 2010 Elder Gulch TSF Expansion Final Report and AMEC January 10, 2011 Elder Gulch TSF Expansion Operating, Maintenance, and

Surveillance Manual).

**2.1.44 Tailings Thickener (C37) (Process Solution Impoundment)**

This facility consists of a 400-foot diameter thickener for dewatering tailings prior to deposition onto the Tailings Facility (C36). Flotation tailings are pumped to the thickeners and thickened tailings are pumped to the Tailings Facility.

**2.1.45 Seepage Collection Pond (C38) (Non-Stormwater Impoundment)**

This facility is designed to contain 8.3-acre feet of seepage from the underdrain channels in the Tailings Facility (C36), seepage from the tailings facility, and surface runoff. Accumulated fluids are pumped from the impoundment to process water storage tanks. An HDPE lined spillway conveys emergency overflows to a 15-acre foot unlined impoundment where fluids are pumped to the operations cycle.

**2.1.46 Contact Stormwater Pond (C39) (Non-Stormwater Impoundment)**

At build-out, this facility is designed to contain 38-acre feet of contact stormwater runoff from the Tailings Facility (C36). Accumulated fluids are pumped back into the operations cycle.

**2.1.47 Tailings Booster Station 1 Pond (C40) (Process Solution Impoundment)**

This facility is designed to contain tailings line drainage during shut-down events. Accumulated fluids are pumped back into the operations cycle.

**2.1.48 Tailings Booster Station 2 Ponds (C41) (Process Solution Impoundment)**

This facility consists of an initial and overflow impoundment connected by three 24-inch HDPE pipes. The approximate capacities are 14,679 cubic feet (109,800 gallons) and 123,000 cubic feet (920,040 gallons), with approximate depths of 4.5 and 7 feet, respectively. The facility collects liquids during periods of downtime, maintenance and/or emergency. Excess liquids are pumped to the Tailings Facility (C36).

**2.1.49 Mill Pond (C32) (Non-Stormwater Impoundment)**

This facility is a proposed lined impoundment located east of Mineral Creek. It will have a capacity of 508,410 cu ft (3,802,890 gal) at high water level and an approximate depth of 10 feet. This facility will collect contact stormwater runoff from the mill area.

**Annual Registration Fee**

**[A.R.S. § 49-242 and A.A.C. R18-14-104]**

The annual registration fee for this permit is established by A.R.S. § 49-242 and is payable to ADEQ each year. The design flow is 10,000,000 gallons per day (gpd).

**Financial Capability**

**[A.R.S. § 49-243(N) and A.A.C. R18-9-A203]**

The permittee has demonstrated financial capability under A.R.S. § 49-243(N) and A.A.C. R18-9-A203. The permittee shall maintain financial capability throughout the life of the facility. The previous closure and post-closure costs of \$14,703,852 and \$6,479,625, respectively, shall be updated in accordance with the Compliance Schedule in Section 3.0. The financial assurance mechanism was demonstrated through A.A.C. R-18-9-A203(C)(1), a financial test for self-assurance and a letter from ASARCO's Chief Financial Officer.

**Annual Registration and Disposal Fees [A.R.S. § 49-747(C) and A.R.S. 49-836]**

The annual registration fee for the Non-Municipal Solid Waste Landfill is established by A.R.S. § 49-747(C). Landfill disposal fees are established by A.R.S. § 49-836 based on the amount of waste landfilled. The fees are payable to ADEQ each year.

## **2.2 Best Available Demonstrated Control Technology**

**[A.R.S. § 49-243(B) and A.A.C. R18-9-A202(A)(5)]**

The Ray Operations are divided into three sub-areas; A, B, and C. Sub-area B consists of the area underlain by the capture zone, characterized as the passive containment created by the Ray open pit. Sub-area A is the mine area located hydrologically upgradient of the passive containment, and Sub-area C is the mine area located hydrologically downgradient of the passive containment. A site map is included with this permit as Attachment 1. BADCT has been determined in accordance with the ADEQ Arizona Mining BADCT Guidance Manual. The permitted facilities shall be constructed, operated, and maintained as described in Section 4.1 Tables 4.1.3, 4.1.4 and 4.1.5 and Section 4.2 Tables 4.2.1, 4.2.2, and 4.2.3.

### **2.2.1 Engineering Design**

The facilities list and BADCT descriptions are provided in Section 4.

### **2.2.2 Site-specific Characteristics**

The passive containment created by the Ray Open Pit has been deemed to satisfy the requirements of A.R.S. § 49-243(G). The passive containment created by the open pit is hydrologically isolated to the extent that it does not allow pollutant migration from within the capture zone. This passive containment is an integral part of the BADCT for all facilities located within Sub-area B, which is defined by the capture zone. Due to the isolated nature, within the Mineral Creek Basin, of the facilities located in Sub-area A, any groundwater flow originating from Sub-area A will flow into the capture zone of the passive containment created by the open pit, and the passive containment is therefore also an integral part of the BADCT for the facilities located within Sub-area A. BADCT evaluation of the existing facilities located in Sub-area C involved the following factors:

- Current discharge control technology (DCT) and site factors;
- Aquifer loading;
- Technically feasible alternative DCTs; and,
- Cost vs. discharge reduction.

### **2.2.3 Pre-operational Requirements**

Not applicable.

### **2.2.4 Operational Requirements**

At a minimum, permitted facilities shall be inspected by the permittee as specified in Section 4.2. Results of these inspections and monitoring activities shall be documented and maintained at the mine location for at least 10 years, and as required by Section 2.7.2 of this permit.

If damage is identified during an inspection that could cause or contribute to an unauthorized discharge, proper repairs shall be promptly performed. A summary of the repairs, including a description of the procedures and materials used, shall be maintained with the inspection records noted above.

## **2.3 Discharge Limitations**

**[A.R.S. § 49-201(14), 49-243 and A.A.C. R18-9-A205(B)]**

The permittee shall operate and maintain all permitted facilities listed below to prevent unauthorized discharges pursuant to A.R.S. § 49-201(12) resulting from failure or bypassing of BADCT pollutant control technologies including liner failure<sup>1</sup>, uncontrollable leakage, overtopping (e.g., exceeding the maximum storage capacity, defined as a fluid level exceeding the crest elevation of a permitted impoundment), berm breaches that result in an unexpected loss of fluid, accidental spills, or other unauthorized discharges. The discharge limitations in this

---

<sup>1</sup> Liner failure in a single-lined impoundment is any condition that would result in leakage exceeding 550 gallons per day per acre.

section are not applicable to any discharge caused by precipitation in excess of the 100-year/24 hour storm event or process overflow during a power outage exceeding 24 hours in duration.

The permittee shall operate and maintain permitted facilities to prevent unauthorized discharges resulting from a variety of conditions, such as, but not limited to, overtopping, liner failure, uncontrollable leakage, berm breaches, and accidental spills. See Section 2.6.3 regarding specific contingency actions to be taken in the event of a discharge limitation exceedance.

The permittee shall not allow overtopping by exceeding the maximum storage capacity of permitted impoundments or ponds and shall maintain the design freeboard in each during operation. During unusual conditions, such as, but not limited to, storm events in excess of the design storm, the permittee shall implement appropriate emergency measures referred to in the contingency plan, Section 2.6.

### **2.3.1 Rock Deposition Areas (RDAs)**

The RDAs are designed and authorized for use in leaching of ore. The RDAs shall be constructed and operated in accordance with the BADCT outlined in Section 4.1, Tables 4.1.3, 4.1.4, and 4.1.5, and the ultimate heights shall not exceed those listed in Section 4.1, Tables 2A, 2B4.1.3, 4.1.4, and 2C4.1.5.

### **2.3.2 Process Solution Impoundments**

The Process Solution Impoundments are designed and authorized to receive raffinate, pregnant leach solution, stormwater, process water, seepage and process upset events.

<b>Sub Area A</b>	<b>Sub Area C (cont.)</b>
9 North Sump (A27)	8 Series Pond (C3.3)
4F Impoundment (A28)	7C Pond (C7C.2)
9 Sump (A4D.3)	7B Dam (C7B.1)
<b>Sub Area B</b>	Upper Slimes Pond (C3)
1B Dam (Sulfide Sump) (B1B.1)	Middle Slimes Dam (C3.2)
1A Dam (B1A.2)	Middle Slimes Pond (C3.2b)
Concentrator Non-Stormwater Pond (B1A.3)	Lower Slimes Dam (C11)
PM Bay Sump and Truck Wash (B1A.4)	7C Dam (C7C.1)
Ray Concentrator Collection Pond (B5)	Big and Little Dome Ponds and Truck Wash (C1)
Dalton's Pond (B4.1)	7D Dam (C7D.1)
<b>Sub Area C</b>	7E Raffinate Storage Pond (C34)
7A Booster Impoundment (C45)	Stacker Dam (C12)
Mill Pond (C32)	Goat Ranch Lined Pond (C20.1)
Lower Suzie D Impoundment (C7)	Elder Gulch Tailings Facility (C36)
7A Dam (C7A.7)	Tailings Thickener (C37)
Electrowinning Dam (C9)	Tailings Booster Station 1 Pond (C40)
	Tailings Booster Station 2 Ponds (C41)

### **2.3.3 Non-Stormwater Impoundments**

The Non-Stormwater Ponds and Impoundments are designed and authorized to receive stormwater runoff and run-on, seepage, and process solutions as a result of storm events or process upset events.

<b>Sub Area A</b>	<b>Sub Area C</b>
none	Retention Basin (C35)
<b>Sub Area B</b>	Seepage Collection Pond (C38)
Last Turn Stormwater Diversion Channel (B29)	ContactStormwater Pond (C39)
10 Pond (B33)	

### **2.3.4 Tailings Thickeners**

The Tailings Thickeners are restricted to receiving only tailings material from the Ray Concentrator.

### **2.3.5 Tailings Facility**

The permittee is restricted to a maximum deposition of 65,400 tpd, by dry weight of tailings from the Ray Unit's copper extraction flotation process. Total deposition of tailings over the life of the facility shall not cause the ultimate dam height to exceed an elevation of 2,590 feet above mean sea level.

If the permittee wishes to deposit a greater quantity of tailings, or modify the ultimate height of the dam, the permittee shall apply for a permit amendment pursuant to Section 6.9.

All tailings deposited at the permitted site shall be derived from the flotation process at the Ray Concentrator..

### **2.4 Point(s) of Compliance**

**[A.R.S. § 49-244]**

The POCs are established by the following monitoring location(s):

<b>POC Locations</b>	<b>ADWR Registration Number</b>	<b>Latitude (North)</b>	<b>Longitude (West)</b>
R-18	55-534853	33° 07' 34"	110° 58' 35"
R-19	55-534852	33° 07' 34"	110° 58' 35"
R-22	55-543974	33° 07' 33"	110° 58' 36"
R-2	55-525710	33° 07' 17.3"	110° 58' 14.9"
R-2a	55-533677	33° 07' 09.8"	110° 57' 53.7"
R-3	55-525711	33° 07' 07.5"	110° 57' 32.3"
R-4	55-525712	33° 07' 03.9"	110° 57' 07.0"
R-4a	55-534346	33° 07' 40.8"	110° 56' 56.3"

Monitoring requirements for each POC are listed in Section 4.2, Tables 4.2.4 and 4.2.5.

The Director may amend this permit to designate additional POCs, if information on groundwater gradients or groundwater usage indicates the need.

The Pollutant Management Area circumscribes all permitted, potentially discharging facilities at the site, and was used to identify appropriate points of compliance.

### **2.5 Monitoring Requirements**

**[A.R.S. § 49-243(B) and (K)(1), A.A.C. R18-9-A206(A)]**

Unless otherwise specified in this permit, all monitoring required in this permit shall continue for the duration of the permit, regardless of the status of the facility. Monitoring shall commence the first full monitoring period following permit issuance. All sampling, preservation and holding times shall be in accordance with currently accepted standards of professional practice. Trip blanks, equipment blanks and duplicate samples shall also be obtained, and Chain-of-Custody procedures shall be followed, in accordance with currently accepted standards of professional practice. Copies of laboratory analyses and Chain-of-Custody forms shall be maintained at the permitted facility. Upon request, these documents shall be made immediately available for review by ADEQ personnel.

#### **2.5.1 Discharge Monitoring**

None required by this permit.

#### **2.5.2 Facility / Operational Monitoring**

The operational monitoring requirements for the facilities referenced in Section 2.2.1 are listed in

Section 4.2, Tables 4.2.1, 4.2.2, and 4.2.3.

### 2.5.3 Groundwater Monitoring and Sampling Protocols

Static water levels shall be measured and recorded prior to sampling. ASARCO may conduct groundwater monitoring and sampling using one or a combination of the following methods:

1. Wells shall be purged of at least three borehole volumes (as calculated using the static water level) or until field parameters (pH, temperature, conductivity) are stable, whichever represents the greater volume.
2. Using the low-flow purging method as described in the Arizona Water Resources Research Center, March 1995 *Field Manual for Water Quality Sampling*. The well must be purged until indicator parameters stabilize. Indicator parameters include pH, temperature, and conductivity.

If evacuation results in the well going dry, the well shall be allowed to recover to 80 percent of the original borehole volume, or for 24 hours, whichever is shorter, prior to sampling. If after 24 hours there is not sufficient water for sampling, the well shall be recorded as “dry” for the monitoring event. An explanation for reduced pumping volumes, a record of the volume pumped, and modified sampling procedures shall be reported and submitted with the Self-monitoring Report Form (SMRF).

#### 2.5.3.1 Point of Compliance Well Replacement

In the event that one or more of the designated POC wells should become unusable or inaccessible due to damage or any other event, a replacement POC well shall be constructed and installed upon approval by ADEQ. If the replacement well is 50 feet or less from the original well, the ALs and/or aquifer quality limits (AQLs) calculated for the designated POC well shall apply to the replacement well. Otherwise the ALs and/or AQLs shall be set following the provisions in Section 2.5.3.2 of this permit.

#### 2.5.3.2 Alert Levels for POC Wells

Alert levels shall be calculated for all parameters identified in Section 4.2, Tables 4.2.4 and 4.2.5 for which a numeric aquifer water quality standard (AWQS) has been adopted or identified as “reserved”. To document the ambient sampling program, the permittee shall submit the ambient groundwater monitoring data in tabulated form to the ADEQ APP Program for review. Copies of all laboratory analytical reports, field notes, the Quality Assurance/Quality Control (QA/QC) procedures used in collection and analysis of the samples, and a report including the statistical calculation of the Alert Levels (ALs) and Aquifer Quality Limits (AQLs) for all parameters required in Section 4.2, Tables 4.2.4 and 4.2.5, shall be included. The permittee may submit a report with the calculations for each AL and AQL included in the permit for review and approval by ADEQ, or the permittee may defer calculation of the ALs and AQLs to the Groundwater Section (GWS). The ALs shall be established and calculated by the following formula, or another valid statistical method submitted to the GWS in writing and approved for this permit by the GWS.

$$AL = M + K\Phi$$

Where M = mean,  $\Phi$  = standard deviation, and K = one-sided normal tolerance interval with a 95% confidence level (Lieberman, G.J. (1958) Tables for One-sided Statistical Tolerance Limits: Industrial Quality Control, Vol XIV, No. 10). Obvious outliers should be excluded from the data used in the AL calculation.

The following criteria shall be met in establishing ALs for new wells in the permit:

1. The AL will be calculated for a parameter using the analyses from a minimum of eight consecutive quarterly sample rounds. Subject to ADEQ approval, additional rounds of sampling may be requested by the Permittee.



2. Any data where the PQL exceeds 80% of the AWQS shall not be included in the AL calculation.
3. If a parameter is below the detection limit, the permittee must report the value as “less than” the numeric value for the PQL or detection limit for the parameter, not just as “non-detect”. For those parameters, the permittee shall use a value of one-half the reported detection limit for the AL calculation.
4. If the analytical results from more than 50% of the samples for a specific parameter are non-detect, then the AL shall be set at 80% of the AWQS.
5. If the calculated AL for a specific constituent and well is less than 80% of the AWQS, the AL shall be set at 80% of the AWQS for that constituent in that well.

#### **2.5.3.3 Aquifer Quality Limits for POC Wells**

AQLs shall be established in the permit for all parameters identified in Section 4.2, Tables 4.2.4 and 4.2.5 for which a numeric AWQS has been adopted or identified as “reserved”. For each required parameter in each individual POC well, the AQL shall be established as follows:

1. If the calculated AL is less than the AWQS, then the AQL shall be set equal to the AWQS.
2. If the calculated AL is greater than the AWQS, then the AQL shall be set equal to the calculated AL value, and no AL shall be set for that constituent at that monitoring point.

#### **2.5.4 Surface Water Monitoring and Sampling Protocols**

None required by this permit.

#### **2.5.5 Analytical Methodology**

All samples collected for compliance monitoring shall be analyzed using Arizona state-approved methods. If no state-approved method exists, then any appropriate EPA-approved method shall be used. Regardless of the method used, the detection limits must be sufficient to determine compliance with the regulatory limits of the parameters specified in this permit. If all methods have detection limits higher than the applicable limit, the permittee shall follow the contingency requirements of Section 2.6 and may propose “other actions” including amending the permit to set higher limits. Analyses shall be performed by a laboratory licensed by the Arizona Department of Health Services, Office of Laboratory Licensure and Certification unless exempted under A.R.S. § 36-495.02.. For results to be considered valid, all analytical work shall meet quality control standards specified in the approved methods. A list of Arizona state-certified laboratories can be obtained at the address below:

Arizona Department of Health Services  
Office of Laboratory Licensure and Certification  
250 North 17<sup>th</sup> Avenue  
Phoenix, AZ 85007  
Phone: (602) 364-0720

#### **2.5.6 Installation and Maintenance of Monitoring Equipment**

Monitoring equipment required by this permit shall be installed and maintained so that representative samples required by the permit can be collected. If new groundwater wells are determined to be necessary, the construction details shall be submitted to the ADEQ Groundwater Section for approval prior to installation and the permit shall be amended to include any new points.

#### **2.5.7 Compliance Groundwater Quality Monitoring for POCs**

Quarterly compliance groundwater monitoring in each POC well shall commence within the first calendar quarter after completion of the ambient groundwater sampling period. The parameters to be analyzed for quarterly compliance monitoring are listed in Section 4.2, Table 4.2.4. In addition to quarterly compliance groundwater monitoring for parameters listed in Section 4.2, Table 4.2.4 for POC wells; an extended list of parameters shall be monitored at POC wells R-18, R-19 and R-22 once

every two years (biennial). For the biennial monitoring events, the additional parameters listed in Section 4.2, Table 4.2.5 shall be analyzed. The biennial sampling parameters shall be in addition to the regularly scheduled quarterly sampling parameters.

### **2.5.8 Passive Containment Demonstration**

Based on supporting documentation provided in the Application, the permittee has satisfactorily predicted that the Ray open-pit mine will create a passive containment capture zone, as per A.R.S. § 49-243(G). A post-audit of the approved groundwater flow model shall be conducted by December 18, 2013. The results of the post-audit shall be submitted to the ADEQ GWS for review in a report that summarizes the original passive containment demonstration and any updates or revisions made to the model. Factors to be evaluated in the post-audit include groundwater inflow, the estimated static water level in the pit, the estimated time to reach static water level, and any potential for the water level in the pit to rise to an elevation where the hydraulic gradient reverses and the pit ceases to function as a hydraulic sink. The report shall include a table listing groundwater elevations from piezometer and monitor wells current at the time of the post-audit, used to demonstrate the configuration of the passive containment, and a potentiometric contour map based on groundwater elevations used in the post-audit passive containment demonstration.

Every five years thereafter, the permittee shall compare the current groundwater data to the previous model predictions. The assumptions about mine development and infiltration shall be reviewed in terms of the actual changes in pit configuration, leaching areas, leach rates, sump locations, water balance, annual precipitation and storm events. The resulting compilation shall be compared to predictions provided by the groundwater flow model for the previous calibration period. A report summarizing the original passive containment demonstration and the revisions made to the model shall be submitted to the ADEQ GWS for review. Each post-audit report shall include a revised table of groundwater elevation for the piezometer and monitor wells used in the demonstration and a revised potentiometric contour map for the passive containment capture area. ADEQ will determine whether a full model recalibration is required. If a recalibration is necessary, a report summarizing the revisions and/or changes to the model shall be submitted to the ADEQ GWS.

## **2.6 Contingency Plan Requirements**

**[A.R.S. § 49-243(K)(3), (K)(7) and A.A.C. R18-9-A204 and R18-9-A205]**

### **2.6.1 General Contingency Plan Requirements**

At least one copy of this permit and the approved contingency and emergency response plan submitted in the application on August 16, 2012, shall be maintained at the location where day-to-day decisions regarding the operation of the facility are made. The permittee shall be aware of and follow the contingency and emergency plan.

Any AL that is exceeded or any violation of an AQL, discharge limit (DL), or other permit condition shall be reported to ADEQ following the reporting requirements in Section 2.7.3, unless more specific reporting requirements are set forth in Section 2.6.

Some contingency actions involve verification sampling. Verification sampling shall consist of the first follow-up sample collected from a location that previously indicated a violation of an AQL, DL or other permit condition or the exceedance of an AL. Collection and analysis of the verification sample shall use the same protocols and test methods to analyze for the pollutant or pollutants that exceeded an AL or violated an AQL. The permittee is subject to enforcement action for the failure to comply with any contingency actions in this permit. Where verification sampling is specified in this permit, it is the option of the permittee to perform such sampling. If verification sampling is not conducted within the timeframe allotted, ADEQ and the permittee shall presume the initial sampling result to be confirmed as if verification sampling has been conducted. The permittee is responsible for compliance with contingency plans relating to the exceedance of an AL or violation of a DL, AQL or any other permit condition.

## 2.6.2 Exceeding of Alert Levels

### 2.6.2.1 Exceeding of Alert Levels Set for Operational Conditions

#### 1. Performance Levels Set for Freeboard

In the event that freeboard performance levels in a surface impoundment as specified in Tables 4.1.3, 4.1.4, and 4.1.5 are not maintained, the permittee shall:

- a. As soon as practicable, cease or reduce discharging to the impoundment to prevent overtopping. Remove and properly dispose or recycle to other operations the excess fluid in the impoundment until the water level is restored at or below the permitted freeboard limit.
- b. Within 5 days of discovery, evaluate the cause of the incident and adjust operational conditions as necessary to avoid future occurrences.
- c. Record in the facility log, the amount of fluid removed, a description of the removal method, and the disposal arrangements. The facility log shall be maintained according to Section 2.7.2 (Operational Inspection / Log Book Recordkeeping). Records documenting each freeboard incident and actions taken to correct the problem shall be submitted to the WQCS in accordance with Section 2.6.3.2.
- d. The facility is no longer on alert status once the operational indicator no longer indicates that the freeboard performance level is being exceeded. The permittee shall, however, complete all tasks necessary to return the facility to its pre-alert operating condition.

#### 2. Performance Levels, Other Than Freeboard

- a. If an operational AL listed in Section 4, Tables 4.2.1, 4.2.2 or 4.2.3 has been observed or noted during required inspection and operational monitoring, such that the result could cause or contribute to an unauthorized discharge, the permittee shall immediately investigate to determine the cause of the condition. The investigation shall include the following:
  - i. Inspection, testing, and assessment of the current condition of all treatment or pollutant discharge control systems that may have contributed to the operational performance condition.
  - ii. Review of recent process logs, reports, and other operational control information to identify any unusual occurrences.
- b. The AL exceedance, results of the investigation, and any corrective action taken shall be reported to the Water Quality Compliance Section (WQCS), within thirty (30) days of the discovery of the condition. Upon review of the submitted report, the Department may amend the permit to require additional monitoring, increased frequency of monitoring, or other actions.
- c. The permittee shall initiate actions identified in the approved contingency plan referenced in Section 3 and any specific contingency measures identified in Section 2.6 to resolve any problems identified by the investigation which may have led to an AL being exceeded. To implement any other corrective action the permittee shall obtain prior approval from ADEQ according to Section 2.6.6.

### 2.6.2.3 Exceeding of Alert Levels in Groundwater Monitoring

#### 2.6.2.3.1 Alert Levels for Indicator Parameters

1. If an AL for an indicator parameter set in Section 4.2, Tables 4.2.4 and 4.2.5 has been exceeded, the permittee may conduct verification sampling within 5 days of becoming aware of the AL exceedance. The permittee may use the results of another sample taken between the date of the last

sampling event and the date of receiving the result as the verification sample.

2. If verification sampling confirms the AL exceedance or if the permittee opts not to perform verification sampling, then the permittee shall sample for the complete set of pollutants listed in Section 4.2, , Tables 4.2.4 and 4.2.5 at the frequency specified in that Table.
3. The permittee shall continue testing for this set of pollutants until all indicator parameters have remained below the AL for four consecutive sampling events.

#### **2.6.2.3.2 Alert Levels for Pollutants with Numeric Aquifer Water Quality Standards**

1. If an AL for a pollutant set in Section 4.2, Table 4.2.3 or 4.2.4 has been exceeded, the permittee shall request that the laboratory verify the sample results within five (5) days. If the analysis does not confirm that an exceedance has occurred, the permittee may assume that there is no exceedance and no further action is required under this subsection. If the exceedance is confirmed, the permittee may conduct verification sampling for that parameter within 5 days of becoming aware of an AL exceedance. The permittee may use the results of another sample taken between the date of the last sampling event and the date of receiving the result as verification.
- 2(a). If verification sampling confirms the AL exceedance or if the permittee opts not to perform verification sampling, then the permittee shall increase the frequency of monitoring for that parameter to monthly. In addition, the permittee shall immediately initiate an investigation of the cause of the AL exceedance, including inspection of all relevant discharging facilities and related pollution control devices, review of any operational and maintenance practices that might have resulted in an unexpected discharge, and hydrologic review of groundwater conditions including upgradient water quality from existing wells.
- 2(b). If the verification sample does not confirm that an exceedance has occurred, the permittee shall notify ADEQ of the results and assume there has been no exceedance. No further action will then be required under this subsection.
3. The permittee shall initiate actions identified in the approved contingency plan referenced in Section 3.0 and specific contingency measures identified in Section 2.6 to resolve any problems identified by the investigation which may have led to an AL exceedance. To implement any other corrective action the permittee shall obtain prior approval from ADEQ according to Section 2.6.6. Alternatively, the permittee may submit a technical demonstration, subject to written approval by the Groundwater Section, that although an AL is exceeded, pollutants are not reasonably expected to cause a violation of an AQL. The demonstration may propose a revised AL or monitoring frequency for approval in writing by the Groundwater Section.
4. Within 30 days after confirmation of an AL exceedance, the permittee shall submit the laboratory results to the Water Quality Compliance Section along with a summary of the findings of the investigation, the cause of the AL exceedance, and actions taken to resolve the problem.
5. Upon review of the submitted report, the Department may amend the

permit to require additional monitoring, increased frequency of monitoring, or other actions.

6. The increased monitoring required as a result of an AL exceedance may be reduced to the regular frequency, if the results of three (3) sequential sampling events demonstrate that no parameters exceed the AL.
7. If the increased monitoring required as a result of an AL exceedance continues for more than six (6) sequential sampling events, the permittee shall submit a second (2<sup>nd</sup>) report documenting an investigation of the continued AL exceedance within 30 days of the receipt of laboratory results of the sixth (6<sup>th</sup>) sampling event.

**2.6.2.3.3 Alert Levels to Protect Downgradient Users from Pollutants without Numeric Aquifer Water Quality Standards**

Not applicable.

**2.6.3 Discharge Limitations Violations**

**2.6.3.1 Liner Failure, Containment Structure Failure, or Unexpected Loss of Fluid For a Reason other than Overtopping**

In the event of liner failure, containment structure failure, or unexpected loss of fluid as described in Section 2.3, the permittee shall take the following actions:

1. As soon as practicable, cease or minimize all discharges to the surface impoundment as necessary to prevent any further releases to the environment.
2. Within 24-hours of discovery, notify ADEQ Water Quality Compliance Section.
3. Within five days of discovery of a failure that resulted in a discharge to the subsurface, collect representative samples of the fluid remaining in the surface impoundment. Samples shall be analyzed for the parameters specified in Section 4.2 , Table 4.2.4 . Within 30 days of the incident, submit a copy of the analytical results to ADEQ Water Quality Compliance Section.
4. Within 15 days of discovery, initiate an evaluation to determine the cause for the incident. Identify the circumstances that resulted in the failure and assess the condition of the surface impoundment and liner system. Implement corrective actions as necessary to resolve the problems identified in the evaluation. Initiate repairs to any failed liner, system, structure, or other component as needed to restore proper functioning of the surface impoundment. The permittee shall not resume discharging to the surface impoundment until repairs of any failed liner or structure are performed. Repair procedures, methods, and materials used to restore the system(s) to proper operating condition shall be described in the facility log/recordkeeping file and available for ADEQ review.
5. As soon as practicable, remove fluid remaining in the surface impoundment as necessary to prevent further releases to the subsurface and/or to perform repairs. Record in the facility log/recordkeeping file the amount of fluid removed, a description of the removal method, and other disposal arrangements. The facility log/recordkeeping file shall be maintained according to Section 2.7.2 (Operation Inspection / Log/Recordkeeping File).
6. Within 30 days of discovery of the incident, submit a report to ADEQ as specified in Section 2.7.3.2 (Permit Violation and AL Status Reporting). Include a description of the actions performed in Subsections 1 through 5 listed above. Upon review of the report, ADEQ may request additional monitoring or remedial actions.
7. Within 60 days of discovery, conduct an assessment of the impacts to the subsoil and/or groundwater resulting from the incident. If soil or groundwater is impacted such that it could cause or contribute to an exceedance of an AQL at the applicable point of compliance, submit to ADEQ, for approval, a corrective action plan to address such impacts, including identification of remedial actions and/or monitoring, and a schedule for completion of activities. At the direction of ADEQ, the permittee shall implement

the approved plan.

8. Within 30 days of completion of corrective actions, submit to ADEQ, a written report as specified in section 2.6.6 (Corrective Actions). Upon review of the report, ADEQ may amend the permit to require additional monitoring, increased frequency of monitoring, amendments to permit conditions, or other actions.

#### **2.6.3.2 Overtopping of a Surface Impoundment**

If overtopping of fluid from a permitted surface impoundment occurs, and results in a discharge pursuant to A.R.S. § 49-201(12), the permittee shall:

1. As soon as practicable, cease or minimize all discharges to the surface impoundment to prevent any further releases to the environment.
2. Within 24-hours of discovery, notify ADEQ Water Quality Compliance Section.
3. Within five days, collect representative samples of the fluid contained in the surface impoundment. Samples shall be analyzed for the parameters specified in Section 4.2, Table 4.2.4. Within 30 days of the incident, submit a copy of the analytical results to ADEQ Water Quality Compliance Section.
4. As soon as practicable, remove and properly dispose of excess water in the impoundment until the water level is restored at or below the appropriate freeboard as described in Section 4.1, Table 4.1.3, 4.1.4 or 4.1.5. Record in the facility log, the amount of fluid removed, a description of the removal method, and the disposal arrangements. The facility log/recordkeeping file shall be maintained according to Section 2.7.2 (Operation Inspection / Log/Recordkeeping File).
5. Within 30 days of discovery, evaluate the cause of the overtopping and identify the circumstances that resulted in the incident. Implement corrective actions and adjust operational conditions as necessary to resolve the problems identified in the evaluation. Repair any systems as necessary to prevent future occurrences of overtopping.
6. Within 30 days of discovery of overtopping, submit a report to ADEQ as specified in section 2.7.3.2 (Permit Violation and AL Status Reporting). Include a description of the actions performed in Subsections 1 through 5 listed above. Upon review of the report, ADEQ may request additional monitoring or remedial actions.
7. Within 60 days of discovery, and based on sampling in Subsection 3 above, conduct an assessment of the impacts to the subsoil and/or groundwater resulting from the incident.
8. If soil or groundwater is impacted such that it could cause or contribute to an exceedance of an AQL at the applicable point of compliance, submit to ADEQ for approval, a corrective action plan to address such impacts, including identification of remedial actions and/or monitoring, and a schedule for completion of activities. At the direction of ADEQ, the permittee shall implement the approved plan.
9. Within 30 days of completion of corrective actions, submit to ADEQ, a written report as specified in Section 2.6.6 (Corrective Actions). Upon review of the report, ADEQ may amend the permit to require additional monitoring, increased frequency of monitoring, amendments to permit conditions, or other actions.

#### **2.6.3.3 Inflows of Unexpected Materials to a Surface Impoundment**

The types of materials that are expected to be placed in the permitted surface impoundments are specified in Section 2.3 (Discharge Limitations). If any unexpected materials flow to a permitted surface impoundment, the permittee shall:

1. As soon as practicable, cease all unexpected inflows to the surface impoundment(s).
2. Within 24-hours of discovery, notify ADEQ Water Quality Compliance Section.
3. Within five days of the incident, identify the source of the material and determine the cause for the inflow. Characterize the unexpected material and contents of the affected impoundment, and evaluate the volume and concentration of the material to determine if it is compatible with the surface impoundment liner. Based on the evaluation of the incident, repair any systems or equipment and/or adjust operations, as necessary to

prevent future occurrences of inflows of unexpected materials.

4. Within 30 days of an inflow of unexpected materials, submit a report to ADEQ as specified in section 2.7.3.2 (Permit Violation and AL Status Reporting). Include a description of the actions performed in Subsections 1 through 3 listed above. Upon review of the report, ADEQ may request additional monitoring or remedial actions.
5. Upon review of the report, ADEQ may amend the permit to require additional monitoring, increased frequency of monitoring, amendments to permit conditions, or other actions.

#### **2.6.3.4 Exceeding of Discharge Limitation for Tailings Deposition Rate**

1. If the DL set in Section 2.3.5 has been exceeded, the permittee shall immediately investigate to determine the cause of the DL being exceeded. The investigation shall include a review of recent process logs, reports, and other operational control information to identify the cause of the exceedance.
2. The permittee shall initiate actions to return to compliance with the DL as soon as practicable.
3. Within 30 days of a DL being exceeded, the permittee shall submit to the ADEQ Water Quality Compliance Section, a summary of the findings of the investigation, the cause of the DL being exceeded, and actions taken to resolve the problem.
4. Upon review of the submitted report, the Department may amend the permit to require additional monitoring, increased frequency of monitoring, amendments to permit conditions or other actions.

#### **2.6.4 Aquifer Quality Limit Violation**

1. If an AQL set in Section 4.0, Table 4.2.3 and 4.2.4 has been exceeded, the permittee shall request that the laboratory verify the sample results within five (5) days. If the analysis does not confirm that an exceedance has occurred, the permittee may assume that there is no exceedance and no further action is required under this subsection. If the exceedance is confirmed, the permittee may conduct verification sampling for the parameter within 5 days of becoming aware of an AQL exceedance. The permittee may use the results of another sample taken between the date of the last sampling event and the date of receiving the result as verification.
- 2(a). If verification sampling confirms that the AQL is violated for the parameter or if the permittee opts not to perform verification sampling, then the permittee shall increase the frequency of monitoring to monthly. In addition, the permittee shall immediately initiate an evaluation for the cause of the violation, including inspection of all relevant discharging units and related pollution control devices, and review of any operational and maintenance practices that might have resulted in unexpected discharge.

The permittee also shall submit a report according to Section 2.7.3, which includes a summary of the findings of the investigation, the cause of the violation, and actions taken to resolve the problem. A verified exceedance of an AQL will be considered a violation unless the permittee demonstrates within 30 days that the exceedance was not caused or contributed to by pollutants discharged from the facility. Unless the permittee has demonstrated that the exceedance was not caused or contributed to by pollutants discharged from the facility, the permittee shall consider and ADEQ may require corrective action that may include control of the source of discharge, cleanup of affected soil, surface water or groundwater, and mitigation of the impact of pollutants on existing uses of the aquifer. Corrective actions shall either be specifically identified in this permit, included in an ADEQ approved contingency plan, or separately approved according to Section 2.6.6.

- 2(b). If the verification sample does not confirm that an exceedance has occurred, the permittee shall

notify ADEQ of the results and assume there has been no exceedance. No further action will then be required under this subsection.

3. Upon review of the submitted report, the Department may amend the permit to require additional monitoring, increased frequency of monitoring, or other actions.
4. The permittee shall notify any downstream or down-gradient users who may be directly affected by the discharge.
5. The increased monitoring required as a result of an AQL exceedance may be reduced to the regular frequency, if the results of three (3) sequential sampling events demonstrate that no parameters exceed the AL.

**2.6.5 Emergency Response and Contingency Requirements for Unauthorized Discharges pursuant to A.R.S. §49-201(12) and pursuant to A.R.S. § 49-241 that are not addressed elsewhere in Section 2.6**

**2.6.5.1 Duty to Respond**

The permittee shall act immediately to correct any condition resulting from a discharge pursuant to A.R.S. § 49-201(12) if that condition could pose an imminent and substantial endangerment to public health or the environment.

**2.6.5.2 Discharge of Hazardous Substances or Toxic Pollutants**

In the event of any unauthorized discharge pursuant to A.R.S. § 49-201(12) of suspected hazardous substances (A.R.S. § 49-201(19)) or toxic pollutants (A.R.S. § 49-243(I)) on the facility site, the permittee shall promptly isolate the area and attempt to identify the discharged material. The permittee shall record information, including name, nature of exposure and follow-up medical treatment, if necessary, on persons who may have been exposed during the incident. The permittee shall notify the ADEQ Water Quality Compliance Section within 24 hours upon discovering the discharge of hazardous material which (a) has the potential to cause an AWQS or AQL to be exceeded, or (b) could pose an endangerment to public health or the environment.

**2.6.5.3 Discharge of Non-hazardous Materials**

In the event of any unauthorized discharge pursuant to A.R.S. § 49-201(12) of non-hazardous materials from the facility, the permittee shall promptly attempt to cease the discharge and isolate the discharged material. Discharged material shall be removed and the site cleaned up as soon as possible. The permittee shall notify the ADEQ Water Quality Compliance Section within 24 hours upon discovering the discharge of non-hazardous material which (a) has the potential to cause an AQL to be exceeded, or (b) could pose an endangerment to public health or the environment.

**2.6.5.4 Reporting Requirements**

The permittee shall submit a written report for any unauthorized discharges reported under Sections 2.6.5.2 and 2.6.5.3 to ADEQ Water Quality Compliance Section within 30 days of the discharge or as required by subsequent ADEQ action. The report shall summarize the event, including any human exposure, and facility response activities and include all information specified in Section 2.7.3. If a notice is issued by ADEQ subsequent to the discharge notification, any additional information requested in the notice shall also be submitted within the time frame specified in that notice. Upon review of the submitted report, ADEQ may require additional monitoring or corrective actions.

**2.6.6 Corrective Actions**

Specific contingency measures identified in Section 2.6 and actions identified in the approved contingency plan referenced in Section 5.0 have already been approved by ADEQ and do not require written approval to implement.



With the exception of emergency response actions taken under Section 2.6.5, the permittee shall obtain written approval from the Groundwater Section prior to implementing a corrective action to accomplish any of the following goals in response to exceeding an AL or violation of an AQL, DL, or other permit condition:

1. Control of the source of an unauthorized discharge;
2. Soil cleanup;
3. Cleanup of affected surface waters;
4. Cleanup of affected parts of the aquifer; and/or
5. Mitigation to limit the impact of pollutants on existing uses of the aquifer.

Within 30 days of completion of any corrective action, the operator shall submit to the ADEQ Water Quality Compliance Section, a written report describing the causes, impacts, and actions taken to resolve the problem.

## **2.7 Reporting and Recordkeeping Requirements**

**[A.R.S. § 49-243(K)(2) and A.A.C. R18-9-A206(B) and R18-9-A207]**

### **2.7.1 Self-monitoring Report Form**

1. The permittee shall complete the SMRFs provided by ADEQ, and submit them to the Water Quality Compliance Section, Data Unit.
2. The permittee shall complete the SMRF to the extent that the information reported may be entered on the form. If no information is required during a reporting period, the permittee shall enter "not required" on the SMRF and submit the report to ADEQ. The permittee shall use the format devised by ADEQ. The permittee may provide a single certification for all SMRF's in lieu of signing each individual SMRF.
3. Section 4.0, Tables 4.2.4 and 4.2.5, list the parameters to be monitored and the frequency for reporting results on the SMRF. The parameters listed in Tables 4.2.4 and 4.2.5 are the only parameters for which SMRF reporting is required.
4. In addition to the SMRF, the information contained in A.A.C. R18-9-A206(B)(1) shall be included for exceeding an AL or violation of an AQL, DL, or any other permit condition being reported in the current reporting period.

### **2.7.2 Operation Inspection / Log Book Recordkeeping**

A signed copy of this permit shall be maintained at all times at the location where day-to-day decisions regarding the operation of the facility are made. A log book (paper copies, forms or electronic data) of the inspections and measurements required by this permit shall be maintained at the location where day-to-day decisions are made regarding the operation of the facility. The log book shall be retained for ten years from the date of each inspection, and upon request, the permit and the log book shall be made immediately available for review by ADEQ personnel. The information in the log book shall include, but not be limited to, the following information as applicable:

1. Name of inspector;
2. Date and shift inspection was conducted;
3. Condition of applicable facility components;
4. Any damage or malfunction, and the date and time any repairs were performed;
5. Documentation of sampling date and time;
6. Any other information required by this permit to be entered in the log book; and
7. Monitoring records for each measurement shall comply with R18-9 A206(B)(2).

A permittee shall make a monitoring record for each measurement made, as required by the individual permit, consisting of all of the following:

- a. The date, time, and exact place of the measurement and the name of each individual who performed the measurement;
- b. The procedures used to make the measurement; and
- c. Any field notes relating to the information described in subsections (B)(2)(a) and (b).

### **2.7.3 Permit Violation and Alert Level Status Reporting**

1. The permittee shall notify the Water Quality Compliance Section in writing within 5 days (except as provided in Section 2.6.5) of becoming aware of a violation of any permit condition, discharge limitation or of an AL exceedance for which notification requirements are not specified elsewhere in this permit.
2. The permittee shall submit a written report to the Water Quality Compliance Section within 30 days of becoming aware of the violation of any permit condition or discharge limitation. The report shall document all of the following:
  - a. Identification and description of the permit condition for which there has been a violation and a description of its cause;
  - b. The period of violation including exact date(s) and time(s), if known, and the anticipated time period during which the violation is expected to continue;
  - c. Any corrective action taken or planned to mitigate the effects of the violation, or to eliminate or prevent a recurrence of the violation;
  - d. Any monitoring activity or other information which indicates that any pollutants would be reasonably expected to cause a violation of an AWQS;
  - e. Proposed changes to the monitoring which include changes in constituents or increased frequency of monitoring; and
  - f. Description of any malfunction or failure of pollution control devices or other equipment or processes.

### **2.7.4 Annual Groundwater Reporting**

The permittee shall submit an annual groundwater monitoring summary report to the Groundwater Section. This report shall be due at the same time as the SMRF form for the last quarterly sampling event for the year. The report shall include, but not be limited to the following:

1. A description of any deviations from standard sampling protocols during the reporting period.
2. A summary of all exceedances of ALs, AQLs, Action Levels, or operational limits or discharge limitations that occurred during the reporting period.3 Graphical time versus concentration plots of field pH, sulfate, total dissolved solids, and any parameter which exceeded an applicable AL or AQL in the past eight quarters at each POC well, and tabulated sampling data for all wells required to be sampled by this permit during the last eight quarters.
4. An updated table of all monitor wells and piezometers in the Discharge Impact Area including, but not limited to, location of well, depth of well, depth to water.
5. A summary of any groundwater monitor wells replaced in the reporting period including, but not limited to, location of well, depth of well, depth to water, and screened interval.
6. A list of any new sumps, impoundments, or vehicle washes constructed within the passive containment, unless exempt or covered by a general APP.

### **2.7.5 Reporting Location**

All SMRFs shall be submitted to:

Arizona Department of Environmental Quality  
 Water Quality Compliance Section, Data Unit  
 Mail Code: 5415B-1  
 1110 W. Washington Street  
 Phoenix, AZ 85007  
 Phone (602) 771-4513

All documents required by this permit to be submitted to the Water Quality Compliance Section shall

be directed to:

Arizona Department of Environmental Quality  
Water Quality Compliance Section  
Mail Code: 5415B-1  
1110 W. Washington Street  
Phoenix, AZ 85007  
Phone (602) 771-4497

All documents required by this permit to be submitted to the Groundwater Section shall be directed to:

Arizona Department of Environmental Quality  
Groundwater Section  
Mail Code: 5415B-3  
1110 W. Washington Street  
Phoenix, AZ 85007  
Phone (602) 771-4428

#### **2.7.6 Reporting Deadline**

The following table lists the quarterly report due dates<sup>2</sup>:

<b>Monitoring conducted during quarter:</b>	<b>Quarterly Report due by:</b>
January-March	April 30
April-June	July 30
July-September	October 30
October-December	January 30

#### **2.7.7 Changes to Facility Information in Section 1.0**

The Groundwater Section and Water Quality Compliance Section shall be notified within 10 days of any change of facility information including Facility Name, Permittee Name, Mailing or Street Address, Facility Contact Person or Emergency Telephone Number.

#### **2.8 Temporary Cessation**

**[A.R.S. § 49-243(K)(8) and A.A.C. R18-9-A209(A)]**

The permittee shall give written notice to the Water Quality Compliance Section before ceasing operation of the facility for a period of 60 days or greater.

At the time of notification the permittee shall submit for ADEQ approval a plan for maintenance of discharge control systems and for monitoring during the period of temporary cessation. Immediately following ADEQ's approval, the permittee shall implement the approved plan. If necessary, ADEQ shall amend permit conditions to incorporate conditions to address temporary cessation. During the period of temporary cessation, the permittee shall provide written notice to the Water Quality Compliance Section of the operational status of the facility every three years. If the permittee intends to permanently cease operation of any facility, the permittee shall submit closure notification, as set forth in Section 2.9 below.

#### **2.9 Closure**

**[A.R.S. §§ 49-243(K)(6), 49-252 and A.A.C. R18-9-A209(B)]**

For a facility addressed under this permit, the permittee shall give written notice of closure to the Water Quality Compliance Section of the permittee's intent to cease operation without resuming activity for which the facility

<sup>2</sup>A post-mark date no later than the due date is considered meeting the due date requirements under this Section.

was designed or operated.

**2.9.1 Closure Plan**

Within 90 days following notification of closure, the permittee shall submit for approval to the Groundwater Section, a Closure Plan which meets the requirements of A.R.S. § 49-252 and A.A.C. R18-9-A209(B)(3).

If the closure plan achieves clean closure immediately, ADEQ shall issue a letter of approval to the permittee. If the closure plan contains a schedule for bringing the facility to a clean closure configuration at a future date, ADEQ may incorporate any part of the schedule as an amendment to this permit.

**2.9.2 Closure Completion**

Upon completion of closure activities, the permittee shall give written notice to the Groundwater Section indicating that the approved Closure Plan has been implemented fully and providing supporting documentation to demonstrate that clean closure has been achieved (soil sample results, verification sampling results, groundwater data, as applicable). If clean closure has been achieved, ADEQ shall issue a letter of approval to the permittee at that time. If any of the following conditions apply, the permittee shall follow the terms of post-closure stated in this permit:

1. Clean closure cannot be achieved at the time of closure notification or within 1 year thereafter under a diligent schedule of closure actions;
2. Further action is necessary to keep the facility in compliance with AWQS at the applicable POC;
3. Continued action is required to verify that the closure design has eliminated discharge to the extent intended;
4. Remediation or mitigation measures are necessary to achieve compliance with Title 49, Ch. 2; and/or
5. Further action is necessary to meet property use restrictions.

**2.10 Post-closure**

**[A.R.S. §§ 49-243(K)(6), 49-252 and A.A.C. R18-9-A209(C)]**

Post-closure requirements shall be established based on a review of facility closure actions and will be subject to review and approval by the Groundwater Section.

In the event clean closure cannot be achieved pursuant to A.R.S. § 49-252, the permittee shall submit for approval to the Groundwater Section a Post-closure Plan that addresses post-closure maintenance and monitoring actions at the facility. The Post-closure Plan shall meet all requirements of A.R.S. §§ 49-201(30) and 49-252 and A.A.C. R18-9-A209(C). Upon approval of the Post-closure Plan, this permit shall be amended or a new permit shall be issued to incorporate all post-closure controls and monitoring activities of the Post-closure Plan.

**2.10.1 Post-closure Plan**

Reserved.

**2.10.2 Post-closure Completion**

Reserved.

**3.0 COMPLIANCE SCHEDULE****[A.R.S. § 49-243(K)(5) and A.A.C. R18-9-A208]**

For each compliance schedule item listed below, the permittee shall submit the required information, including a cover letter that lists the compliance schedule items, to the Groundwater Section. A copy of the cover letter must also be submitted to the Water Quality Compliance Section.

<b>Submittals Not Requiring Permit Amendments</b>		
<b>Description</b>	<b>Completion/Submittal Date</b>	<b>Comments</b>
Closure Plan for the facilities being closed under June 26, 2012 Amendment Application. Facilities include: 1. Imp. Behind Stacker Dam (C22.1) 2. 3 Unlined Middle Slimes Ponds (C3.2b) 3. Crusher Cooling Water Imp (C15.13)	Within 6 months of issuance of LTF-58677	As these facilities had been integrated into larger operating facilities, actual closure will not occur until the larger facilities are closed. Upon completion of closure activities, provide a closure report for each facility indicating the closure activities and results of sampling. Refer to Section 2.9 (Closure).
As built plans for the 4F Impoundment.	Submit within 90 days of completion of construction.	Include certification that the facility was constructed in accordance with plans approved by ADEQ and QA/QC documentation completed for liner and subgrade preparation. The final construction report shall be certified by the on-site construction manager and shall be sealed by a registered professional engineer.
As built plans for the Suzie D Impoundment.	Submit within 90 days of completion of construction.	Refer to Section 2.2.4 (Pre-Operational Requirements)  Include certification that the facility was constructed in accordance with plans approved by ADEQ and QA/QC documentation completed for liner and subgrade preparation. The final construction report shall be certified by the on-site construction manager and shall be sealed by a registered professional engineer.
As built plans for the 10 Pond	Submit within 90 days of completion of construction.	Include certification that the facility was constructed in accordance with plans approved by ADEQ and QA/QC documentation completed for liner and subgrade preparation. The final construction report shall be certified by the on-site construction manager and shall be sealed by a registered professional engineer.
As built plans for the 7E Raffinate Storage Pond	Submit within 90 days of completion of construction.	Include certification that the facility was constructed in accordance with plans approved by ADEQ and QA/QC documentation completed for liner and subgrade preparation. The final construction report shall be certified by the on-site construction manager and shall be sealed by

Submittals Not Requiring Permit Amendments		
		a registered professional engineer.
Post-audit of the approved groundwater flow model	By May 28, 2014 , and every five years thereafter until mine closure	A post-audit report shall be submitted to the ADEQ for review and approval as described in Section 2.5.8 of the permit.

Submittals Requiring Permit Amendment		
Updated closure/post-closure costs	Within 90 days of issuance of amendment 58677	Submit an application for an other amendment to the permit to update the closure/post-closure costs, and provide an updated financial assurance mechanism if appropriate.

#### 4.0 TABLES OF MONITORING REQUIREMENTS

##### 4.1 Facility List

- ☐ TABLE 4.1.1 Permitted Rock Deposition Areas
- ☐ TABLE 4.1.2 Permitted Impoundments
- ☐ TABLE 4.1.3 Sub Area A - Facilities List and BADCT Descriptions
- ☐ TABLE 4.1.4 Sub Area B - Facilities List and BADCT Descriptions
- ☐ TABLE 4.1.5 Sub Area C - Facilities List and BADCT Descriptions
- ☐ TABLE 4.1.6 Removed Facilities List

##### 4.2 Compliance (Or Operational) Monitoring

- ☐ TABLE 4.2.1 Sub Area A - Required Inspections and Operational Monitoring
- ☐ TABLE 4.2.2 Sub Area B - Required Inspections and Operational Monitoring
- ☐ TABLE 4.2.3 Sub Area C - Required Inspections and Operational Monitoring
- ☐ TABLE 4.2.4 Quarterly Compliance Groundwater Monitoring and Reporting Requirements for POC Wells
- ☐ TABLE 4.2.5 Biennial Compliance Groundwater Monitoring and Reporting Requirements
- ☐ TABLE 4.2.6 Deposition Monitoring for Elder Gulch Tailings Facility

TABLE 4.1.1 PERMITTED ROCK DEPOSITION AREAS				
Name	Number	Latitude (N)	Longitude (W)	Area (ac)
<b>Sub Area A</b>				
4-Series RDA	A4RDA	33° 11' 39"	111° 00' 32"	780
9-Series RDA	A9RDA	33° 11' 55"	110° 59' 51"	269
5-Series RDA	A5RDA	33° 11' 42"	110° 59' 04"	813
<b>Sub Area B</b>				
1-Series RDA	B1RDA	33° 09' 28"	110° 59' 29"	442
2-Series RDA	B2RDA	33° 09' 57"	111° 00' 34"	388
3-Series RDA	B3RDA	33° 11' 03"	111° 01' 08"	329
<b>Sub Area C</b>				
7-Series RDA	C7RDA	33° 08' 36"	110° 59' 04"	537
8-Series RDA	C8RDA	33° 08' 57"	110° 57' 54"	744
Notes:				
RDA – Rock Deposition Area (Heap Leach Pad)				
ac – acres				



**TABLE 4.1.2**  
**PERMITTED IMPOUNDMENTS**

Name	Number	Latitude (N)	Longitude (W)	Type	Volume (ac-ft)	Depth (ft)
<b>Sub Area A</b>						
9 North Sump	A27	33° 12' 21"	110° 59' 59"	PS	2,264,749	20
4F Impoundment	A28	33° 12' 02"	111° 00' 30"	PS	148,924,237	188
9 Sump	A4D.3	33° 11' 28"	111° 00' 05"	PS	6,016,000	50
<b>Sub Area B</b>						
Last Turn Stormwater Diversion Channel	B29	33° 10' 36"	111° 01' 03"	NSW <sup>1</sup>	1,611,720	10-30
10 Pond	B33	33° 11' 09"	111° 00' 06"	NSW <sup>1</sup>	246,675	17
1B Dam (Sulfide Sump)	B1B.1	33° 09' 42"	110° 58' 54"	PS	65,000	16
Maintenance Area Truck Wash - Light Vehicle	B30.1	33° 09' 32"	110° 58' 43"	Misc	--	--
Maintenance Area Truck Wash - Heavy Vehicle	B30.2	33° 09' 32"	110° 58' 43"	Misc	--	--
1A Dam	B1A.2	33° 09' 32"	110° 59' 00"	PS	7,800	10
Concentrator Non-Stormwater Pond	B1A.3	33° 09' 32"	110° 58' 58"	PS	11,300	6
PM Bay Sump and Truck Wash	B1A.4	33° 09' 26"	110° 59' 08"	PS	20,000	
Ray Concentrator Collection Pond	B5	33° 09' 20"	110° 58' 44"	PS	124,000	17
Dalton's Pond	B4.1	33° 09' 21"	110° 58' 36"	PS	326,000	50
<b>Sub Area C</b>						
7A Booster Impoundment	C45	33° 09' 11"	110° 58' 57"	PS	1.5	12
Suzie D Impoundment	C31	33° 09' 28"	110° 57' 45"	PS	77,040,653	193
Lower Suzie D Impoundment	C7	33° 09' 08"	110° 58' 26"	PS	29,000	12
7A Dam	C7A.7	33° 08' 59"	110° 58' 42"	PS	460,000	16
Electrowinning Dam	C9	33° 08' 55"	110° 58' 29"	PS	36,000	10
Mill Pond	C32	33° 08' 59"	110° 58' 30"	NSW	11.7	10
8 Series Pond	C3.3	33° 08' 57"	110° 58' 07"	PS	73,000	4
7C Pond	C7C.2	33° 08' 47"	110° 59' 28"	PS	111,000	30
7B Dam	C7B.1	33° 08' 41"	110° 58' 45"	PS	538,000	16
Upper Slimes Pond	C3	33° 08' 43"	110° 58' 01"	PS	375,000,000	30
Middle Slimes Dam	C3.2	33° 08' 43"	110° 58' 20"	PS	11,000	5
Middle Slimes Pond	C3.2b	33° 08' 41"	110° 58' 18"	PS	114,000	12
Lower Slimes Dam	C11	33° 08' 36"	110° 58' 24"	PS	209,000	22
7C Dam	C7C.1	33° 08' 36"	110° 58' 47"	PS	94,000	16
Big and Little Dome Ponds and Truck Wash	C1	33° 08' 39"	110° 58' 39"	PS	1,760,000 and 353,000	16 and 12
7D Dam	C7D.1	33° 08' 19"	110° 58' 37"	PS	746,000	18
7E Raffinate Storage Pond	C34	33° 08' 15"	110° 59' 15"	PS	9,003,933	23
Stacker Dam	C12	33° 08' 11"	110° 58' 19"	PS	125,000	11
Retention Basin	C35	33° 08' 02"	110° 58' 26"	NSW <sup>1</sup>	3,354,000	25
Goat Ranch Lined Pond	C20.1	33° 07' 43"	110° 58' 39"	PS	2,850,000	16



<p align="center"><b>Table 4.1.3</b> <b>SUB AREA A</b> <b>FACILITY LIST AND BADCT DESCRIPTIONS</b></p>	
<b>Facility Name (#)</b>	<b>Facility BADCT</b>
<b>Leach RDAs within the Capture Zone of the Passive Containment</b>	
<p><b>Existing Leaching: east side of Mineral Creek</b></p> <p>4-Series RDA (A4RDA)</p>	<p><b>Individual BADCT:</b> Existing and proposed leach east of Mineral Creek - This rock deposition area (RDA) is constructed over relatively low hydraulic conductivity natural geologic formations, using end dumping method of construction. The side slopes are formed at an angle of repose of the material deposited. Small concrete dams, keyed into bedrock, shall be located downgradient of the RDA for the PLS impoundment. Similar construction arrangement for the PLS impoundment shall be affected at the proposed leaching east and west sides of Mineral Creek. Hydraulic conductivity for the existing leach east side of Mineral Creek ranges from <math>5.5 \times 10^{-5}</math> to <math>4.6 \times 10^{-5}</math> cm/sec.</p> <p>The RDA shall be constructed in lifts 15 feet to over 100 feet in thickness using large haulage trucks. The RDA is located immediately adjacent to and upgradient of the existing Ray Pit - the passive containment, and downgradient of the diversion structure. The facility is located within the capture zone of the passive containment.</p> <p>The ultimate height of the RDA shall not exceed the crest elevation of 3,000 feet above mean sea level (amsl).</p> <p>The RDA construction, when completed, shall not exceed the footprint of the 4-Series RDA shown in the June 26, 2012 APP Amendment Application.</p>
<p><b>Existing Leaching: east and west sides of Mineral Creek</b></p> <p>9-Series RDA (A9RDA)</p>	<p><b>Individual BADCT:</b> Existing and proposed leach east and west side of Mineral Creek - This RDA is constructed over relatively low hydraulic conductivity natural geologic formations, using end dumping method of construction. The side slopes are formed at an angle of repose of the material deposited. Small concrete dams, keyed into bedrock, shall be located downgradient of the RDA for the PLS impoundment. Similar construction arrangement for the PLS impoundment shall be affected at the proposed leaching east and west sides of Mineral Creek. Hydraulic conductivity for the existing leach east side of Mineral Creek ranges from <math>5.5 \times 10^{-5}</math> to <math>4.6 \times 10^{-5}</math> cm/sec; west side of Mineral Creek, it ranges from <math>5.5 \times 10^{-5}</math> to <math>4.0 \times 10^{-7}</math> cm/sec; and for the proposed leach east and west side of Mineral Creek, it ranges from <math>4.5 \times 10^{-5}</math> to <math>4.0 \times 10^{-7}</math> cm/sec.</p> <p>The RDA shall be constructed in lifts 15 feet to over 100 feet in thickness using large haulage trucks. The RDA is located immediately adjacent to and upgradient of the existing Ray Pit - the passive containment, and downgradient of the diversion structure. The facility is located within the capture zone of the passive containment.</p> <p>The ultimate height of the RDA shall not exceed the crest elevation of 3,000 feet amsl.</p> <p>The RDA construction, when completed, shall not exceed the footprint of the 9-Series RDA shown in the June 26, 2012 APP Amendment Application.</p>
<p><b>Existing Leaching: west side of Mineral Creek</b></p>	<p><b>Individual BADCT:</b> Existing and proposed leach west of Mineral Creek - This RDA is constructed over relatively low hydraulic conductivity natural geologic formations, using end dumping method of construction. The side slopes are formed at an angle of repose of the material deposited. Small concrete dams, keyed into bedrock, shall be located downgradient of the RDA for the PLS impoundment. Similar construction</p>

<b>Table 4.1.3</b> <b>SUB AREA A</b> <b>FACILITY LIST AND BADCT DESCRIPTIONS</b>	
<b>Facility Name (#)</b>	<b>Facility BADCT</b>
5-Series RDA (A5RDA)	<p>arrangement for the PLS impoundment shall be affected at the proposed leaching east and west sides of Mineral Creek. Hydraulic conductivity for the existing leach west side of Mineral Creek ranges from <math>5.5 \times 10^{-5}</math> to <math>4.0 \times 10^{-7}</math> cm/sec.</p> <p>The RDA shall be constructed in lifts 15 feet to over 100 feet in thickness using large haulage trucks. The RDA is located immediately adjacent to and upgradient of the existing Ray Pit - the passive containment, and downgradient of the diversion structure. The facility is located within the capture zone of the passive containment.</p> <p>The ultimate height of the RDA shall not exceed the crest elevation of 3,000 feet amsl.</p> <p>The RDA construction, when completed, shall not exceed the footprint of the 5-Series RDA shown in the June 26, 2012 APP Amendment Application.</p>
<b>Process Solution Impoundments within the Capture zone of the Passive Containment</b>	
<b>PLS Ponds, Dams, Sumps, Impoundments and Associated Conveyance Systems; west and east sides of Mineral Creek</b>  9 North Sump (A27)	<b>Individual BADCT:</b> Facility is an unlined, surface impoundments constructed over bedrock. The hydraulic conductivity of underlying bedrock ranges from $5.5 \times 10^{-5}$ to $4.0 \times 10^{-7}$ cm/sec. The facility shall have sufficient storage to contain flows from the 10-year, 24-hour storm event. No geologic hazards are known to exist in the vicinity of this impoundment. All potential discharge and overflow shall report to the Ray Pit - a passive containment, located down gradient of this facility. Pumps and associated equipment shall be maintained in good working order.
9 Sump (A4D.3)	<b>Individual BADCT:</b> Facility is an unlined, surface impoundment excavated into bedrock. The bedrock (Pinal Schist) has an average hydraulic conductivity of $4.0 \times 10^{-7}$ cm/sec. The facility is located downgradient of the existing portal entrance and immediately adjacent to the Ray Pit and Ray Pit induced passive containment. The impoundment is designed to capture leachate from the 4-Series, 5-Series, and 9-Series RDAs. The impoundment has a maximum storage capacity of approximately $45 \times 10^6$ gallons. Overflow reports directly to the Ray Pit. The combined capacity of the impoundment and the Ray Pit far exceeds the capacity required to contain run off from a 100-year, 24-hour storm event. The Mineral Creek Diversion Tunnel extension and diversion structure at the New Mineral Creek Tunnel Inlet shall provide additional discharge controls so that all potential discharge and overflow will report to the Ray Pit - a passive containment, located downgradient of the facility.
4F Impoundment (A28)	<b>Individual BADCT:</b> Facility is an unlined, surface impoundment constructed over bedrock. The hydraulic conductivity of underlying bedrock ranges from $5.5 \times 10^{-5}$ to $4.0 \times 10^{-7}$ cm/sec. The facility shall have sufficient storage to contain the 100 year, 24 hour storm event. No geologic hazards are known to exist in the vicinity of this impoundment. Any leakage and potential overflow will report to the Ray Pit – a passive containment, located downgradient of the facility. A minimum of 2 ft of freeboard shall be maintained.
Notes: amsl - above mean sea level APP – Aquifer Protection Permit BADCT – Best Available Demonstrated Control Technology	
cm/sec – centimeters per second PLS – Pregnant Leach Solution RDA – Rock Deposition Area	

<b>TABLE 4.1.4</b> <b>SUB AREA B</b> <b>FACILITY LIST AND BADCT DESCRIPTIONS</b>	
<b>Facility Name (#)</b>	<b>Facility BADCT</b>
<b>Leach RDAs within the Capture zone of the Passive Containment</b>	
<b>Existing Leaching; west side of Open Pit (part of proposed Valley-fill RDA)</b>  1-Series RDA (B1RDA) 2-Series RDA (B2RDA) 3-Series RDA (B3RDA)	<b>Individual BADCT:</b> The RDAs are constructed with leachable material being deposited over steep and relatively lower hydraulic conductivity ( $4.0 \times 10^{-7}$ cm/sec) natural geologic formations using end dumping method. The material is deposited at an angle of repose employing large haulage trucks. Small dams, keyed into bedrock a minimum of 2 feet, shall be located downgradient of the active RDAs to collect leachate. Subsurface and surface flow shall be collected in the open-pit induced passive containment. Stormwater control shall be provided by the open-pit passive containment for storms in excess of the 100-year, 24-hour storm event. Mineral Creek Diversion Tunnel extension and diversion structure at the New Mineral Creek Tunnel Inlet shall provide additional discharge controls so that all potential discharge will report to the Ray Pit - a passive containment.  The ultimate height of the RDAs shall not exceed the crest elevation of 3,000 feet above mean sea level (amsl).  The RDAs construction, when completed, shall not exceed the RDA footprints shown in the APP Application.
<b>Process Solution Impoundments – Within the Capture Zone of the Passive Containment</b>	
<b>PLS Ponds, Dams, Sumps, Impoundments and Associated Conveyance Systems; west and east sides of Open Pit</b>  1A Dam (B1A.2)  Concentrator Non- Stormwater Pond (B1A.3)  1B Dam (Sulfide Sump) (B1B.1)  Last Turn Stormwater Diversion Channel (B29)	<b>Individual BADCT:</b> Facilities are unlined, surface impoundments consisting of a cutoff wall - typically concrete or low permeability earthen embankments, keyed into bedrock a minimum of 2 feet. The facilities are constructed in relatively low hydraulic conductivity ( $4.0 \times 10^{-7}$ cm/sec) natural geologic formations. Facilities are located downgradient of the associated RDAs. The impoundments shall have sufficient capacity to contain a 10-year/24-hour storm event. Any overflow reports to the open-pit which is a passive containment comprising Sub-area B. Mineral Creek Diversion Tunnel extension and diversion structure at the New Mineral Creek Tunnel Inlet shall provide additional discharge controls so that all potential discharge will report to the Ray Pit - a passive containment. A minimum of 2 ft of freeboard shall be maintained.

<p style="text-align: center;"><b>TABLE 4.1.4</b> <b>SUB AREA B</b> <b>FACILITY LIST AND BADCT DESCRIPTIONS</b></p>	
<b>Facility Name (#)</b>	<b>Facility BADCT</b>
10 Pond (B33)	<b>Individual BADCT:</b> The facility is a non-storm water impoundment constructed with a 80-mil thick HDPE liner over compacted material, with and engineered anchor trench.. The facility is constructed in relatively low hydraulic conductivity ( $4.0 \times 10^{-7}$ cm/sec) natural geologic formations. The impoundment shall have sufficient capacity to contain a 10-year/24-hour storm event. Any overflow reports to the open-pit which is a passive containment comprising Sub-area B. The pond will be operated with a minimum of 2ft freeboard.
PM Bay Sump and Truck Wash (B1A.4)	<b>Individual BADCT:</b> Facility (B.1A.4) is an unlined impoundment, constructed on the 1-Series RDA and collects leach solution from the 1-Series and 7-Series RDAs. The impoundment shall serve as an operational control, collecting solution from these RDAs and gravity feeds, via HDPE pipeline to 1B Dam (Sulfide Sump). The impoundment is an integral part of the 1-Series RDA, in that, all potential discharge reports to the Ray Pit - a passive containment comprising Sub-area B.
Maintenance Area Truck Wash – Light Vehicle (B30.1)	<b>Individual BADCT:</b> Facilities B30.1 and B30.2 are concrete-lined sumps. The facilities are constructed in relatively low hydraulic conductivity ( $4.0 \times 10^{-7}$ cm/sec) natural geologic formations. The impoundments shall receive wash water from the truck wash. Any overflow from the Light Vehicle wash reports to the Big Dome Pond. Overflow from the Heavy Vehicle wash reports to Dalton's Pond. These facilities are within the containment of the Ray Pit - a passive containment.
Maintenance Area Truck Wash – Heavy Vehicle (B30.2)	
Ray Concentrator Collection Pond (B5)	<b>Prescriptive BADCT:</b> Facility (B5) is constructed with a composite liner, using a 60-mil HDPE geomembrane overlying a 12-inch thick, low permeability compacted soil. The impoundment shall be operated with a minimum of 2 feet of freeboard. The impoundment shall receive slurries from the Ray Concentrator during upset conditions and storm run-off from the warehouse outside laydown yard. A variable capacity pump returns the fluids to the Ray Concentrator Tailings Sump. A floating barge pump transfers collected flows either to the Big Dome Pond or back to the mill. Containment of flows from the 100-year, 24-hour storm event shall be provided by the Retention Basin, located downstream within the confines of Sub-area C, through a series of lined and unlined impoundments and concrete-lined side channels.
Dalton's Pond (B4.1)	<b>Individual BADCT:</b> Facility (B4.1) is excavated in alluvium on the west side and in bedrock on the east side, and has compacted earthen embankments, with an 80-mil HDPE liner on the downstream face. To avoid overtopping, the solution is pumped to Big Dome Pond. Big Dome Pond shall be operated with a minimum of 2 feet of freeboard. The pond shall collect surface run-off from the surrounding area of the facility. Any potential seepage from the facility shall be directed to the Retention Basin by the under-drain system constructed in conjunction with the Mineral Creek Lined Channel. The facility can contain flows in excess of the 100-year, 24-hour storm event. Any overflow shall be collected by the west side concrete-lined channel, which goes to the Retention Basin.
Solid Waste Landfill (B3.2)	Individual BADCT description to be provided in accordance with Section 3.0. 1. Disposal of the following is allowed under this permit: a. Solid waste generated at the mining site where the landfill is located; and b. Incidental amounts of putrescible waste as defined in 40 CFR § 257.3-8(e)(7)..  2. Disposal of the following is prohibited under this permit:

<p style="text-align: center;"><b>TABLE 4.1.4</b> <b>SUB AREA B</b> <b>FACILITY LIST AND BADCT DESCRIPTIONS</b></p>	
<b>Facility Name (#)</b>	<b>Facility BADCT</b>
	<p>a. Used oil as defined in A.R.S. § 49-801(3).</p> <p>b. Human excreta as defined in R18-13-1102.</p> <p>c. Special waste as defined in A.R.S. § 49-851(a)(5).</p> <p>d. Biohazardous medical waste as defined in R18-13-1401.</p> <p>e. Radioactive waste material regulated for disposal pursuant to Title 12, Chapter 1 of the Arizona Administrative Code.</p> <p>f. Hazardous waste as defined in A.R.S. § 49-921(5), including hazardous waste generated by a conditionally exempt small quantity generator.</p> <p>g. Bulk or non-containerized liquid waste.</p> <p>h. Waste containing polychlorinated biphenyls regulated for disposal pursuant to 40 C.F.R. Part 761.</p>
<p>Notes:</p> <p>amsl - above mean sea level</p> <p>APP – Aquifer Protection Permit</p> <p>BADCT – Best Available Demonstrated Control Technology</p>	
<p>cm/sec – centimeters per second</p> <p>PLS – Pregnant Leach Solution</p> <p>RDA – Rock Deposition Area</p>	

<b>TABLE 4.1.5</b> <b>SUB AREA C</b> <b>FACILITY LIST AND BADCT DESCRIPTIONS</b>	
<b>Facility Name (#)</b>	<b>Facility BADCT</b>
<b>Leach RDAs within the Hydrologic Influence of the Retention Basin - Non-passive Containment</b>	
<b>Existing Leaching; east side of Mineral Creek</b>  8-Series RDA (C8RDA)	<p><b>Individual BADCT:</b> The 8-Series RDA is constructed over relatively low hydraulic conductivity natural geologic formations, using end dumping method of construction. The hydraulic conductivity of the bedrock underlying the RDA ranges from <math>1.3 \times 10^{-4}</math> cm/sec to <math>3.4 \times 10^{-6}</math> cm/sec. The side slopes of the RDA are formed at the angle of repose of the material deposited. Small concrete dams, keyed into bedrock, shall be located downgradient of the RDA for PLS impoundment.</p> <p>The ultimate height of the RDA shall not exceed the crest elevation of 3,000 feet amsl.</p> <p>The RDA construction, when completed, shall not exceed the respective footprint shown in the APP Application.</p> <p>Containment of surface or subsurface flows and the run-off from the 100-year, 24-hour storm event shall be provided by the Retention Basin, located downstream within the confines of Sub-area C, through a series of lined and unlined impoundments and concrete-lined side channels.</p>
<b>Leach RDAs within the Hydrologic Influence of the Retention Basin - Non-passive Containment (cont'd)</b>	
<b>Existing Leaching; west side of Mineral Creek</b>  7-Series RDA (C7RDA)	<p><b>Individual BADCT:</b> The 7-Series RDA is constructed over relatively low hydraulic conductivity natural geologic formations, using end dumping method of construction. The hydraulic conductivity of the bedrock underlying the RDA ranges from <math>1.3 \times 10^{-4}</math> cm/sec to <math>3.4 \times 10^{-6}</math> cm/sec. The side slopes are formed at an angle of repose of the material deposited. Small concrete dams, keyed into bedrock, shall be located downgradient of the RDA for PLS impoundment. Constructed in the 7E drainage is a geomembrane lined cutoff wall, backfilled with a controlled formulation of soil-bentonite backfill.</p> <p>The ultimate height of the RDA shall not exceed the crest elevation of 3,000 feet amsl.</p> <p>The RDA construction, when completed, shall not exceed the respective footprint shown in the APP Application.</p> <p>The sub-surface flows from Sub-area C above the retention dam, including the 7-Series RDAsRDA, shall be collected by three pumpback wells which pump to the tailings seepage collection pond in Elder Gulch for reuse in the mill circuit/7E Raffinate Storage Pond (C34) or pump to the Retention Basin when necessary.(C35). For the surface flows and run-off from the 100-year, 24-hour storm event, the Retention Basin shall be equipped with a submersible pumping system (2000 and 500 gpm) which will convey the incoming flows to either the Big Dome Pond and Dalton's Pond and/or the Ray Pit – a passive containment.</p>



<p align="center"><b>TABLE 4.1.5</b> <b>SUB AREA C</b> <b>FACILITY LIST AND BADCT DESCRIPTIONS</b></p>	
<b>Facility Name (#)</b>	<b>Facility BADCT</b>
<b>Process Solution Impoundments – Within the Hydrologic Influence of the Retention basin - Non-passive Containment</b>	
<p><b>PLS Ponds, Sumps, Impoundments and Associated Conveyance Systems; east and west sides of Mineral Creek</b></p> <p>7A Booster Impoundment (C45)</p>	<p><b>Individual BADCT:</b> Facility C45 is a process water impoundment primarily used to contain PLS from the 7 Series RDA. This facility is constructed with 3 Horizontal: 1 Vertical side slopes. The estimated impoundment volume for this facility is approximately 0.5 million gallons with total operational depth of 11.6 feet. The pond has a double liner system consisting of an 80-mil primary liner over a 60-mil secondary liner. The Leachate Collection and Recovery System (LCRS) is provided with a geonet layer between the primary and secondary liner. Leachate collects to a drainage aggregate layer at a low point in the pond. No geologic hazards are known to exist in the vicinity of the impoundment</p>
Suzie D Impoundment (C31)	<p><b>Individual BADCT:</b> The Suzie D Impoundment is an unlined non-storm water impoundment constructed in a natural drainage channel underlain by shallow alluvium and the Big Dome conglomerate with hydraulic conductivity ranging from <math>5.5 \times 10^{-5}</math> to <math>4.0 \times 10^{-7}</math> cm/sec. The Suzie D Impoundment cut-off wall will be keyed into existing rock Slope on the impoundment will be minimum 3 horizontal to 1 vertical (angle of repose). The Suzie D Impoundment will receive pumped mine water from various sumps located on site. The main source of water will be mine water collected in the bottom of the Amanda Pit. Water stored in Suzie D Impoundment will be pumped via barge mounted pump to desired points, primarily the 8 series RDAs for use in the leaching process. The pond will be operated with 2ft of freeboard, and have sufficient capacity to handle the 100yr 24hr storm event. No geologic hazards are known to exist and any leakage from the Suzie D impoundment will ultimately report toe the Lower Suzie D Impoundment and be pumped to the Big Dome Pond.</p>
Lower Suzie D Impoundment (C7)	<p><b>Individual BADCT:</b> Facility (C7) is an unlined impoundment of concrete/earthen structure keyed into bedrock (Big Dome conglomerate). To avoid overtopping, an HDPE overflow pipe shall be located 11 inches below the dam crest elevation. The overflow pipe conveys excess solution to the Big Dome Pond by gravity feed. The Big Dome Pond shall be operated with a minimum of 2 feet of freeboard. The facility shall be equipped with two vertical pumps to pump the solution to the Big Dome Pond via HDPE pipeline. The impoundment shall receive inflows and stormwater runoff from the 8-Series RDA. An emergency collection sump and portable pumpback system shall be located downgradient of the impoundment to pump back overflow in case of an emergency. Containment of flows from the 100-year, 24-hour storm event shall be provided by the Retention Basin, located downstream within the confines of Sub-area C, through a series of lined and unlined impoundments and concrete-lined side channels.</p>
<p>7A Dam (C7A.7)</p> <p>7B Dam (C7B.1)</p> <p>7C Dam (C7C.1)</p>	<p><b>Individual BADCT:</b> Facilities are impoundments created by a reinforced concrete wall keyed into bedrock a minimum of 5 feet. The impoundments are located in relatively low hydraulic conductivity (ranging from <math>1.3 \times 10^{-4}</math> to <math>3.4 \times 10^{-6}</math> cm/sec) natural geologic formations. The impoundments shall collect leachate at the toes of the associated RDAs. The 7C Dam shall have a pumpback system located downgradient of the 7C Dam and the Big Dome Pond. To minimize discharge at the 7D Dam, static head reduction shall be used such that the impoundment is operated with a fluid depth not to exceed 12 feet. The impoundment fluid level may be temporarily increased for solution management. The operating fluid level, not exceeding 12 feet, shall be restored as soon</p>

<p style="text-align: center;"><b>TABLE 4.1.5</b> <b>SUB AREA C</b> <b>FACILITY LIST AND BADCT DESCRIPTIONS</b></p>	
<b>Facility Name (#)</b>	<b>Facility BADCT</b>
7D Dam (C7D.1)	as practicable. Containment of surface and subsurface flows and run-off from the 100-year, 24-hour storm event shall be provided by the Retention Basin, located downstream within the confines of Sub-area C, through a series of lined and unlined impoundments and concrete-lined side channels. To avoid overtopping of the dams, an HDPE overflow pipe of sufficient diameter shall be located 25 inches below the dam crest elevations of each of the 7A, 7B, and 7D Dams, and 8 inches below the dam crest elevation of 7C Dam. The overflow pipes convey excess solution from these impoundments by gravity flow, to the Big Dome Pond. The Big Dome Pond shall be operated with a minimum of 2 feet of freeboard.
Electrowinning (EW)Dam (C9)	<b>Individual BADCT:</b> Facility (C9) is an unlined impoundment, constructed behind a concrete/earthen dam and has a reinforced concrete headwall keyed into bedrock. The impoundment is located in a relatively low hydraulic conductivity geologic formation (Big Dome conglomerate) with an average hydraulic conductivity of $3.4 \times 10^{-6}$ cm/sec. A concrete sump located about 100 feet downstream of the dam shall be designed to capture and pumpback any spillage from the EW Plant. EW Dam overflow is routed to the Lower Slimes Dam via gravity through an HDPE pipeline. A pumpback system shall be incorporated in the EW Building, immediately downgradient from the EW Dam to intercept any overflow from the dam. EW Dam overflow is routed to the Lower Slimes Dam via gravity flow through an HDPE pipeline located 2 feet 9 inches below the dam crest elevation. The HDPE overflow pipe at the Lower Slimes Dam conveys excess solution to the Big Dome Pond by gravity feed. The EW Dam shall collect fluid from wet scrubbers and process areas of the plant. Containment of surface and subsurface flows and the run-off from the 100-year, 24-hour storm event shall be provided by the Retention Basin, located downstream within the confines of Sub-area C, through a series of lined and unlined impoundments and concrete-lined side channels.
Mill Pond (C32)	<b>Individual BADCT:</b> Facility (C32) is a lined impoundment constructed over a compacted subgrade. The pond collects contact stormwater from the mill area. This facility is constructed with 2 Horizontal: 1 Vertical side slopes. The impoundment volume is approximately 3,802,890 gallons with total operational depth of 10 feet. The pond shall be operated with a minimum of 2 feet of freeboard. Rip rap is provided at major entrances and at the emergency spillway. Containment of surface flows and the run-off from the 100-year, 24-hour storm event shall be provided by the Retention Basin, located downstream within the confines of Sub-area C, through a series of lined and unlined impoundments and concrete-lined side channels. No geologic hazards are known to exist in the vicinity of the impoundment.
8-Series Pond (C3.3)	<b>Individual BADCT:</b> Facility (C3.3) is an unlined impoundment excavated within the alluvium. The bottom of the pond is comprised of man-made fill and alluvium/colluvium and has accumulated relatively low hydraulic conductivity slimes ( $1 \times 10^{-6}$ cm/sec) at the base of the impoundment. The pond shall collect leachate from the 8-Series RDA. Containment of surface and subsurface flows and the run-off from the 100-year, 24-hour storm event shall be provided by the Retention Basin, located downstream within the confines of Sub-area C, through a series of lined and unlined impoundments and concrete-lined side channels.

<p align="center"><b>TABLE 4.1.5</b> <b>SUB AREA C</b> <b>FACILITY LIST AND BADCT DESCRIPTIONS</b></p>	
<b>Facility Name (#)</b>	<b>Facility BADCT</b>
7C Pond (C7C.2)	<b>Individual BADCT:</b> This impoundment is an unlined pond constructed over relatively low hydraulic conductivity ( $1 \times 10^{-6}$ cm/sec) material at the base of the impoundment. Containment of surface or subsurface flows and run-off from the 100-year 24hr storm event shall be provided by the Retention Basin located downstream within the confines of Sub-area C.
Upper Slimes (PLS) Pond (C3)	<b>Individual BADCT:</b> Impoundment (C3) is constructed over Big Dome conglomerate with the bottom of the pond lined with low permeability ( $1 \times 10^{-6}$ cm/sec) slimes - leached residue slurry from the thickener tanks. Containment of surface or subsurface flows and the run-off from the 100-year, 24-hour storm event shall be provided by the Retention Basin, located downstream within the confines of Sub-area C, through a series of lined and unlined impoundments and concrete-lined side channels.
Middle Slimes Dam (C3.2)	<b>Individual BADCT:</b> Facility (C3.2) is an impoundment created by a reinforced concrete headwall intercepting the drainage path immediately downstream of the toe of the fill embankment. The bottom of the pond is comprised of relatively low permeability ( $1 \times 10^{-6}$ cm/sec) fine grained slimes over Big Dome conglomerate with limited alluvium. The impoundment shall collect solution which seeps through the embankment of the Upper Slimes Pond. The solution from the impoundment is pumped to the SX/EW Plant. To avoid overtopping, an HDPE overflow pipe shall be located 3 feet 2 inches below the dam crest elevation to convey solution by gravity through the Lower Middle Slimes Pond to the Lower Slimes Dam. Containment of surface and subsurface flows and the run-off from the 100-year, 24-hour storm event shall be provided by the Retention Basin, located downstream within the confines of Sub-area C, through a series of lined and unlined impoundments and concrete-lined side channels.
Middle Slimes Pond (C3.2b)	<b>Individual BADCT:</b> Impoundment (C3.2b) is constructed over Big Dome conglomerate (average hydraulic conductivity of $3.4 \times 10^{-6}$ cm/sec) with limited alluvium. An overflow pipe shall be located 2 feet below the crest of the Pond to convey solution to the Lower Slimes Dam by gravity-feed. Containment of surface and sub-surface flows and the run-off from the 100-year, 24-hour storm event shall be provided by the Retention Basin, located downstream within the confines of Sub-area C, through a series of lined and unlined impoundments and concrete-lined side channels.
Lower Slimes Dam (C11)	<b>Individual BADCT:</b> Facility (C11) is an impoundment created by a concrete dam keyed into a relatively low hydraulic conductivity bedrock (Big Dome conglomerate with an average hydraulic conductivity of $3.4 \times 10^{-6}$ cm/sec). To avoid overtopping, an HDPE overflow pipe shall be located 2 feet below the dam crest elevation. The overflow pipe conveys excess solution by gravity feed to the Big Dome Pond. The Big Dome Pond shall be operated with a minimum of 2 feet of freeboard. A cutoff wall and pump-back system shall be installed immediately downgradient of the Lower Slimes Dam. The impoundment shall collect fluids from the 8-Series RDA, the Upper and Middle Slimes pond areas and overflow from the EW and Middle Slimes dams. Containment of surface and subsurface flows and the run-off from the 100-year, 24-hour storm event shall be provided by the Retention Basin, located downstream within the confines of Sub-area C, through a series of lined and unlined impoundments and

<p style="text-align: center;"><b>TABLE 4.1.5</b> <b>SUB AREA C</b> <b>FACILITY LIST AND BADCT DESCRIPTIONS</b></p>	
<b>Facility Name (#)</b>	<b>Facility BADCT</b>
	concrete-lined side channels.
Big and Little Dome Ponds and Truck Wash (C1)	<b>Individual BADCT:</b> Facilities (C1) are two adjoining impoundments located in the Mineral Creek alluvium and are constructed using an 80-mil HDPE liner. The ponds shall be operated with a minimum of 2 feet of freeboard observed at the Big Dome Pond. The facilities shall impound mostly sewage treatment plant effluent and stormwater run-off and overflow from the 7-Series Dams, sulfide sump, Suzie D Dam and the Lower Slimes Dam. Two pumps shall be installed at the Big Dome Pond to transfer stormwater to either the open pit in Sub-area B or to the Retention Basin in Sub-area C. An additional diesel-generated pump shall be available at the Big Dome Pond in the event of emergency. Containment of surface and subsurface flows and the run-off from the 100-year, 24-hour storm event shall be provided by the Retention Basin, located downstream within the confines of Sub-area C, through a series of lined and unlined impoundments and concrete-lined side channels.
7E Raffinate Storage Pond (C34)	<b>Individual BADCT:</b> Facility (C34) is an impoundment located in the Mineral Creek alluvium and is constructed using an 80-mil HDPE liner over a 60 mil secondary liner. A Leachate Collection and Recovery System (LCRS) is provided by a geonet layer between the primary and secondary liner. Leachate collects to a drainage aggregate layer at a lowpoint in the pond. A 10-inch HDPE pipe, carrying the 1.5 inch pump suction line, shall be used to penetrate the drainage aggregate and pump out any liquid collected in the sump. The facility shall be operated with a minimum of 2 feet of freeboard. Containment of surface and subsurface flows and the run-off from the 100-year, 24-hour storm event shall be provided by the Retention Basin, located downstream within the confines of Sub-area C, through a series of lined and unlined impoundments and concrete-lined side channels.
Stacker Dam (C12)	<b>Individual BADCT:</b> Facility (C12) is an unlined impoundment, created behind a concrete dam and has a reinforced concrete headwall keyed into bedrock. The impoundment is located in a relatively low hydraulic conductivity geologic formation (Big Dome conglomerate) with an average hydraulic conductivity of $3.4 \times 10^{-6}$ . To avoid overtopping, an HDPE overflow pipe shall be located 10 inches below the dam crest elevation. The overflow pipe conveys excess solution to the Goat Ranch Lined Pond (C20.1) by gravity feed. The Goat Ranch Lined Pond shall be operated with a minimum of 2 feet of freeboard. The facility shall collect leachate at the toe of the 8-Series RDA. The dam shall have a pump-back system and an emergency overflow catchment immediately downstream. Containment of surface and subsurface flows and the run-off from the 100-year, 24-hour storm event shall be provided by the Retention Basin, located downstream within the confines of Sub-area C, through a series of lined and unlined impoundments and concrete-lined side channels.
Retention Basin (C35)	The facility is an unlined impoundment constructed with an earthen embankment. The earthen embankment is comprised of the following components: - A 15 foot wide low permeability (hydraulic conductivity equal to or less than $1 \times 10^{-6}$ cm/sec) core wall constructed into bedrock; - A minimum of 5 foot wide chimney drain fill, upgradient of the low permeability core wall;

<p style="text-align: center;"><b>TABLE 4.1.5</b> <b>SUB AREA C</b> <b>FACILITY LIST AND BADCT DESCRIPTIONS</b></p>	
<b>Facility Name (#)</b>	<b>Facility BADCT</b>
	<ul style="list-style-type: none"> <li>- Two vertical riser pipes installed into the chimney drain material to facilitate dewatering of the embankment fill and alluvium;</li> <li>- Riprap (D50 = 2 ft) on the upstream and downstream faces of the embankment to reduce the erosion potential; and</li> <li>- The ogee portion of the embankment crest is lined with concrete to limit erosion of the clay core material.</li> </ul> <p>The Retention Basin has an overall storage volume of approximately 3,354,000 cu ft which far exceeds the flows of the 100-year, 24-hour storm event from the watersheds of Sub-area C. The depth of the retention basin is approximately 25 ft. The retention basin shall be used as temporary storage of stormwater run-off or for unforeseen emergency spills. A pump-back bedrock sump shall be located approximately 50 feet upgradient of the cut-off wall and keyed into bedrock to exhaust water out of the chimney drain. The Retention Basin shall be equipped with a 500 gpm pump and a 2,000 gpm pump to exhaust flows from the 47 acre-feet design storm within less than 5 days. The two large pumps (500 gpm and 2,000 gpm) are connected to a 12-inch diameter pipeline to discharge solution into the Ray Pit or Big Dome Pond and Dalton's Pond. Two diesel-powered generators shall be made available: one in Sub-area B and one in Sub-area C, and an additional diesel-powered generator shall be provided for the 500 gpm in case of power failure.</p>
Goat Ranch Lined Pond (C20.1)	<p><b>Individual BADCT:</b> Facility (C20.1) is a single-lined impoundment using geosynthetic-clay liner (GCL). The impoundment is underlain by the Mineral Creek alluvium with a hydraulic conductivity of <math>1.33 \times 10^{-3}</math> cm/sec. The facility shall receive solutions from the Stacker Dam, 7D Dam and Big Dome Pond via gravity through HDPE pipelines. The impoundment shall have sufficient capacity to contain the stormwater runoff from the 100-year, 24-hour storm event, with a minimum of 2 feet of freeboard. To minimize discharge potential, the facility shall be operated with the hydrostatic head not to exceed 7 feet except in the event of emergency. Upon normalization of such an event, the solution shall be pumped out to lower the hydrostatic head below 7 feet as soon as practicable.</p>
Elder Gulch Tailings (C36)	<p><b>Individual BADCT:</b> Facility C36 is constructed above a rockfill dam and is constructed, operated, and monitored as described and depicted in the October 25, 2010 AMEC Earth and Environmental "ASARCO LLC Ray Mine Complex, Elder Gulch TSF Expansion Final Report" and the January 10, 2011 AMEC Earth and Environmental "ASARCO LLC Ray Mine Complex, Elder Gulch TSF Expansion Operation, Maintenance, and Surveillance Manual."</p> <p>A high capacity granular drain system placed in the main drainages beneath the rockfill dam and impoundment consists of ½" – 3" drain rock over sand and gravel filter over 100-mil HDPE liner. Underdrains in the dam embankment from the final upstream toe of the dam to the seepage collection pond shall be lined with textured 100-mil HDPE. Underdrains beyond the final upstream toe will not be lined.</p> <p>Four-inch-diameter, corrugated, HDPE pipe shall be placed at 100-foot intervals throughout the tailings impoundment in the drainage paths within the impoundment. The ends of the drain pipe shall be terminated in the underdrains.</p>

<p align="center"><b>TABLE 4.1.5</b> <b>SUB AREA C</b> <b>FACILITY LIST AND BADCT DESCRIPTIONS</b></p>	
<b>Facility Name (#)</b>	<b>Facility BADCT</b>
	A seepage collection channel along the face of the tailings dam consists of a 16-inch perforated HDPE pipe within a lined trench approximately 4-feet deep by 3-feet wide. The HDPE liner with Geotextile extends along the top, bottom and downgradient side of the trench such that tailing seepage (seeps) can be captured on the tailing side of the trench. The channel bottom will be covered by Riprap for erosion, scour, and stabilization control. The channel bottom will also be graded at 1/2 of 1% slope (down-gradient).
Tailings Thickener (37)	<b>Individual BADCT:</b> Facility C37 consists of up to one 400-foot diameter tailings thickener. The thickener is underlain with 60-mil HDPE and has a peripheral lined berm to contain the entire contents of the thickener.
Seepage Collection Pond (38)	<b>Individual BADCT:</b> Facility C38 shall be constructed to contain 8.3-acre feet from the underdrain channels, and surface runoff. Liner design consists of an 80-mil HDPE liner placed over a 2-foot-thick silty (and slightly clayey sand layer), compacted to 95 percent of maximum dry density. Accumulated fluids are pumped to process water storage tanks. An HDPE lined spillway conveys emergency overflow to a 15-ac ft unlined impoundment.
Contact Stormwater Pond (C39)	<b>Individual BADCT:</b> Facility C39 shall be constructed to contain all runoff from the drainage channels during a 24-hour/100 year flood event. Liner design consists of a two-foot thick silty and slightly clayey sand layer compacted to 95 percent of maximum dry density and located downgradient of the starter dam.
Tailings Booster Station 1 Pond (C40)	<b>Individual BADCT:</b> Facility C40 is a 60-mil HDPE lined temporary containment area to drain the tailings line in case of shutdown shall be constructed to retain gravity backflow from the tailings pipeline between the thickeners and the floatation cell.
Tailings Booster Station 2 Ponds (C41)	<b>Individual BADCT:</b> Facility C41 consists of an initial and overflow impoundment connected by three 24-inch HDPE pipes. The initial pond is fitted with a 60-mil HDPE liner and the overflow pond is fitted with an 80 mil HDPE liner. Ponds are constructed at the 2,200-foot elevation on the tailings impoundment. The impoundment will only be used to drain the tailing discharge line during periods of downtime, maintenance and/or emergency.
<p>Notes:</p> <div> <div> amsl - above mean sea level  APP – Aquifer Protection Permit  BADCT – Best Available Demonstrated Control Technology </div> <div> cm/sec – centimeters per second  PLS – Pregnant Leach Solution  RDA – Rock Deposition Area </div> </div>	

**TABLE 4.1.6  
 REMOVED FACILITIES LIST**

<b>Facility Name (#)</b>	<b>Lat./Long.</b>	<b>Facility BADCT</b>
<b>Facilities to be closed through burial by the Valley-fill RDA and /or to cease operation without intent to resume activities</b>		
4D Dam (A4D.1)	NA	Facility is a part of the Valley-fill RDA, located upgradient of the Ray Pit - the passive containment. Process solution reporting to the facility will now report to the Mineral Creek Collection Impoundment.
4D Sediment Dam (A4D.2.a)	NA	Facility is a part of the Valley-fill RDA, located upgradient of the Ray Pit - the passive containment. Process solution reporting to the facility will now report to the Mineral Creek Collection Impoundment.
4D Overflow Catchment (A4D.2.b)	NA	Facility is a part of the Valley-fill RDA, located upgradient of the Ray Pit - the passive containment. Process solution reporting to the facility will now report to the Mineral Creek Collection Impoundment.
4X Dam (A4D.3)	NA	Facility is a part of the Valley-fill RDA, located upgradient of the Ray Pit - the passive containment. Process solution reporting to the facility will now report to the Mineral Creek Collection Impoundment.
5E Dry Non-stormwater Impoundment (A5E.1)	NA	Facility has ceased operation without intent to resume activity for which it was designed. Any flows from the 5E RDA will now report to the newly constructed Mineral Creek Collection Impoundment.
Big Surf Pond (7)	NA	Notice of full implementation of ADEQ approved Closure Plan received by ADEQ on June 20, 2002.
Un-named Impoundment north of Big Surf Pond (7.1)	NA	Notice of full implementation of ADEQ approved Closure Plan received by ADEQ on June 20, 2002.
Un-named Impoundment east of Big		Notice of full implementation of ADEQ approved Closure Plan received by ADEQ on June 20,

TABLE 4.1.6 REMOVED FACILITIES LIST		
Facility Name (#)	Lat./Long.	Facility BADCT
Surf Pond (7.2)	NA	2002.
<b>Facilities to be closed through burial by the Valley-fill RDA and/or cease operation without intent to resume activities (cont=d)</b>		
Conveyor Impoundment (C17.2)	NA	Facility has ceased operation without intent to resume activity for which it was designed. Impoundment is buried beneath the Conveyor Canyon RDA.
Heap Solution Pond (8D.1)	NA	Facility has ceased operation without intent to resume activity for which it was designed. Impoundment is eliminated with the planned progression of the Elder Gulch tailings pond containment dike.
7A Test Dams	NA	Facilities closed prior to 1986.
North Sump (B2)	NA	Facility is mined out.
3B Dam (B3B.1)	NA	Facility is mined out.
4A Dam (B4A.1)	NA	Facility is mined out.
PCS Contaminated Soil Pile (4G.3)	NA	Facility has ceased operation without intent to resume activity for which it was designed. All of the sample results were non-detect for all constituents. Based on the sample results, the soil was not a regulated material and remediation /disposal was not necessary.
Truck Wash ((ID.2)	NA	Facility is mined out.
Reclaim and Stormwater Pond (C16.6)	NA	Facility no longer exists. Impoundment is buried under the haul road.



**TABLE 4.1.6**  
**REMOVED FACILITIES LIST**

<b>Facility Name (#)</b>	<b>Lat./Long.</b>	<b>Facility BADCT</b>
North Plant Pumping Station (B5)	NA	Facility was located in the Ray Pit – passive containment, and was mined out.
4B Dam (A4B.3)	NA	Facility no longer exists. Impoundment is buried under the 4-Series RDA.
4B Dam Overflow Catchments (A4B.4)	NA	Facility no longer exists. Impoundment is buried under the 4-Series RDA.
4C Dam(A4C.1)	NA	Facility no longer exists. Impoundment is buried under the 4-Series RDA.
2A Dam (B2A.1)	NA	Consolidated with 2-Series RDA
3C Dam (B3C.1)	NA	Consolidated with 3-Series RDA
5C Dam (B5C.1)	NA	Facility is mined out
Sonora Creek Dams (B1D.3)	NA	Consolidated with 1-Series RDA
Truck Wash Emergency Overflow Impoundment (B13.2)	NA	Facility is mined out
Impoundment (B26.1)	NA	Facility is mined out
7C Highway 177 Pond (n/a)	NA	Remove – APP exempt
Impoundment Behind Stacker RDA (C22.1)	NA	Buried under 8-Series RDA
7A Stormwater Overflow Impoundment (C7A.7a)	NA	Closed – flows diverted to Retention Basin via Mineral Creek Side Ditch
7A Sediment Trap Impoundment (C7A.7b)	NA	Closed – flows diverted to Retention Basin via Mineral Creek Side Ditch
7D Backup Catchments (C7D.2)	NA	Closed – flows diverted to Retention Basin via Mineral Creek Side Ditch
Suzie D Decant Pond (C8A.2)	NA	Buried under 8-Series RDA
EW Dam Impoundment (C8.4)	NA	Closed – flows diverted to Retention Basin via Mineral Creek Side Ditch
Stacker Overflow Pond (C12.1)	NA	Closed – flows diverted to Retention Basin via Mineral Creek Side Ditch
Lower Slimes Overflow Pond (C11.1)	NA	Closed – flows diverted to Retention Basin via Mineral Creek Side Ditch
Secondary Containment and Stormwater Pond (C16.6)	NA	Closed – flows diverted to Retention Basin via Mineral Creek Side Ditch
Stormwater Diversion Ditch (C7C.4)	NA	Closed – facility obsolete with construction of F-Wash
Dust Collection Pond (C10.7)	NA	Closed – flows diverted to Retention Basin via Mineral Creek Side Ditch

TABLE 4.1.6 REMOVED FACILITIES LIST		
Facility Name (#)	Lat./Long.	Facility BADCT
Crusher Cooling Water Impoundment (C15.13)	NA	Closed – flows diverted to Retention Basin via Mineral Creek Side Ditch
3 Unlined Middle Slimes Ponds (C3.2B)	NA	Closed - Facility ceased operation and has been removed

TABLE 4.2.1 SUB AREA A REQUIRED INSPECTIONS AND OPERATIONAL MONITORING	
Facility Name (#)	Operational Requirements
No Leaching Zone (n/a)	<p><b>No Leaching Zone:</b> The no-leaching zone is defined as a portion of the area north of the 9-Series and north and east portions of the 5-Series RDAs, as shown on the site map included with this permit as Attachment 1. No leaching of ore or waste rock is permitted within the designated no-leaching zone. The permittee shall not stockpile any materials, other than those materials determined to be barren, within the designated no-leaching zone of the 9-Series and 5-Series RDAs. Barren materials is defined in this permit as those materials containing less than 0.1% copper and less than 0.5% sulfides, and that when subject to ADEQ approved static or kinetic leachability testing do not produce a leachate containing a contaminant(s) exceeding an AWQS. Only barren materials located in that area within the northeast wall of the open pit mine and described in ASARCO's June 12, 2002 report entitled ASARCO's, <i>Explanation of Barren Material To Be Placed In the No-Leach Zone</i>, may be placed in the no-leaching zone. These materials include post-mineral lithologies consisting of, in descending stratigraphic order, rhyodacite, Gila Conglomerate, and the upper 100-foot section of the Apache Leap dacite.</p> <p><b>Quarterly and after 2"-24hour rain event:</b> Check for any evidence of:</p> <ul style="list-style-type: none"> <li>- instability, including surface cracks, slides, sloughs or unusual settlement;</li> <li>- perforated or cut or damaged liner (as applicable)</li> <li>- excessive erosion in conveyances and diversions;</li> <li>- accumulation of debris in conveyances and diversions; and</li> <li>- impairment of access.</li> </ul>
Leach RDAs within the Capture Zone of the Passive Containment (Existing Leaching: east and west sides of Mineral Creek)	

<p style="text-align: center;"><b>TABLE 4.2.1</b> <b>SUB AREA A</b> <b>REQUIRED INSPECTIONS AND OPERATIONAL MONITORING</b></p>	
<b>Facility Name (#)</b>	<b>Operational Requirements</b>
4-Series RDA (A4RDA) 9-Series RDA (A9RDA) 5-Series RDA (A5RDA)	<p><b>Quarterly and after 2"-24 hour rain event:</b></p> <p>Check for any evidence of:</p> <ul style="list-style-type: none"> <li>- instability, including surface cracks, slides, sloughs or unusual settlement;</li> <li>- excessive erosion in conveyances and diversions;</li> <li>- accumulation of debris in conveyances and diversions; and</li> <li>- impairment of access.</li> </ul>
<p><b><u>Unlined</u> Process Solution Impoundments within the Capture zone of the Passive Containment (Ponds, Dams, Sumps, Impoundments and Associated Conveyance Systems; west and east sides of Mineral Creek)</b></p>	
9 North Sump (A27) 4F Impoundment (A28) 9 Sump (A4D.3)	<p><b>Quarterly and after 2"-24hour rain event:</b></p> <p>Check for any evidence of:</p> <ul style="list-style-type: none"> <li>- Impairment of embankment integrity;</li> <li>- excessive erosion in conveyances and diversions;</li> <li>- accumulation of debris in conveyances and diversions; and</li> <li>- impairment of access.</li> <li>- for facilities equipped with pumps, inspect pumps and structures for pump operation and structural integrity.</li> </ul>
<p>Notes:</p> <div style="display: flex; justify-content: space-between;"> <div>           amsl - above mean sea level            APP – Aquifer Protection Permit            BADCT – Best Available Demonstrated Control Technology         </div> <div>           cm/sec – centimeters per second            PLS – Pregnant Leach Solution            RDA – Rock Deposition Area         </div> </div>	

<p style="text-align: center;"><b>TABLE 4.2.2</b> <b>SUB AREA B</b> <b>REQUIRED INSPECTIONS AND OPERATIONAL MONITORING</b></p>	
<b>Facility Name (#)</b>	<b>Operational Requirements</b>
<b>Leach RDAs within the Capture zone of the Passive Containment (Existing Leaching: west of Open pits)</b>	
1-Series RDA (B1RDA) 2-Series RDA (B2RDA) 3-Series RDA (B3RDA)	<p><b>Quarterly and after 2"-24hour rain event:</b></p> <p>Check for any evidence of:</p> <ul style="list-style-type: none"> <li>- instability, including surface cracks, slides, sloughs or unusual settlement;</li> <li>- excessive erosion in conveyances and diversions;</li> <li>- accumulation of debris in conveyances and diversions; and</li> <li>- impairment of access.</li> </ul>
<b><u>Unlined</u> Process Solution Impoundments within the Capture zone of the Passive Containment (Non-stormwater , Sumps, Impoundments and Associated Conveyance Systems; east and west sides of Mineral Creek)</b>	
1A Dam (B1A.2)  Concentrator Non-Stormwater Pond (B1A.3)  1B Dam (Sulfide Sump) (B1B.1)	<p><b>Quarterly and after 2"-24hour rain event:</b></p> <p>Check for any evidence of:</p> <ul style="list-style-type: none"> <li>- Impairment of embankment integrity;</li> <li>- excessive erosion in conveyances and diversions;</li> <li>- accumulation of debris in conveyances and diversions;</li> <li>- impairment of access; and</li> <li>- for facilities equipped with pumps: inspect pumps and structures for pump operation and structural integrity.</li> </ul>
<b><u>Lined</u> Process Solution Impoundments within the Capture zone of the Passive Containment (PLS Ponds, Dams, Sumps, Impoundments and Associated Conveyance Systems; west and east sides of Open Pit)</b>	
Ray Concentrator Collection Pond (B5)  Dalton's Pond (B4.1)	<p><b>Quarterly and after 2"-24hour rain event:</b></p> <p>Check for any evidence of:</p> <ul style="list-style-type: none"> <li>- Inspect for perforated or cut or damaged liner and impairment of anchor trench integrity;</li> <li>- impairment of embankment integrity;</li> <li>- excessive erosion in conveyances and diversions;</li> <li>- accumulation of debris in conveyances and diversions;</li> </ul>

<p style="text-align: center;"><b>TABLE 4.2.2</b> <b>SUB AREA B</b> <b>REQUIRED INSPECTIONS AND OPERATIONAL MONITORING</b></p>	
<b>Facility Name (#)</b>	<b>Operational Requirements</b>
	<ul style="list-style-type: none"> <li>- impairment of access; and</li> <li>- for facilities equipped with pumps: inspect pumps and structures for pump operation and structural integrity.</li> </ul>
<b>Non-Stormwater Impoundments within the Capture zone of the Passive Containment</b>	
<p>Last Turn Stormwater Diversion Channel (B29)</p> <p>10 Pond (B33)</p>	<p><b>Quarterly and after 2"-24hour rain event:</b> Check for any evidence of:</p> <ul style="list-style-type: none"> <li>- Impairment of embankment integrity;</li> <li>- excessive erosion in conveyances and diversions;</li> <li>- accumulation of debris in conveyances and diversions</li> <li>- impairment of access; and</li> <li>- for facilities equipped with pumps, inspect pumps and structures for pump operation and structural integrity.</li> </ul> <p><b>Annually:</b> Remove excess sediments/sludge from the impoundment as needed to maintain at least 80 percent of design capacity.</p>
<b>Miscellaneous Facilities within the Capture zone of the Passive Containment</b>	
<p>PM Bay Sump and Truck Wash (B.1A.4)</p> <p>Maintenance Area Truck Wash – Light Vehicle (B30.1)</p> <p>Maintenance Area Truck Wash – Heavy Vehicle (B30.2)</p>	<p><b>Quarterly and after 2"-24hour rain event:</b> Check for any evidence of:</p> <ul style="list-style-type: none"> <li>- excessive erosion in conveyances and diversions;</li> <li>- accumulation of debris in conveyances and diversions;</li> <li>- impairment of access; and</li> <li>- for facilities equipped with pumps, inspect pumps and structures for pump operation and structural integrity.</li> </ul> <p><b>Monthly:</b> Remove sediments/sludge from the truck wash sump as needed to maintain at least 80 percent of designed capacity.</p>
Solid Waste Landfill (B3.2)	<p><b>Quarterly and following precipitation events measuring at least 1 inch in a 24-hour period:</b> Visually inspect berms around the perimeter of the landfill for signs of erosion/damage; perform maintenance on an as-needed basis.</p>

<p><b>TABLE 4.2.2</b> <b>SUB AREA B</b> <b>REQUIRED INSPECTIONS AND OPERATIONAL MONITORING</b></p>	
Facility Name (#)	Operational Requirements
<p>Notes:</p> <p>amsl - above mean sea level</p> <p>APP – Aquifer Protection Permit</p> <p>BADCT – Best Available Demonstrated Control Technology</p>	
	<p>cm/sec – centimeters per second</p> <p>PLS – Pregnant Leach Solution</p> <p>RDA – Rock Deposition Area</p>

<p style="text-align: center;"><b>TABLE 4.2.3</b> <b>SUB AREA C</b> <b>REQUIRED INSPECTIONS AND OPERATIONAL MONITORING</b></p>	
<b>Facility Name (#)</b>	<b>Operational Requirements</b>
<b>Leach RDAs within the Hydrologic Influence of the Retention Basin – Non-passive Containment (Existing Leaching east and west of Mineral Creek)</b>	
8-Series RDA (C8RDA) 7-Series RDA (C7RDA)	<p><b>Monthly and after 2”-24hour rain event:</b></p> <p>Check for any evidence of:</p> <ul style="list-style-type: none"> <li>- instability, including surface cracks, slides, sloughs or unusual settlement;</li> <li>- excessive erosion in conveyances and diversions;</li> <li>- accumulation of debris in conveyances and diversions;</li> <li>- impairment of access.</li> <li>- impairment of access,</li> <li>- at pump installations, inspect pumps and structures for pump operation and structural integrity, including inspection for preventative maintenance; and</li> <li>- where equipped, check programmable logic control (PLC) on the pumping system for functional reliability.</li> </ul>
<b><u>Unlined</u> Process Solution Impoundments within the Hydrologic Influence of the Retention Basin – Non-passive Containment (Ponds, Sumps, and Associated Conveyance Systems; east and west sides of Mineral Creek)</b>	
7A Booster Impoundment (C45)  Lower Suzie D Impoundment (C7)  7A Dam (C7A.7)  Electrowinning (EW) Dam (C9)  8-Series Pond (C3.3)  7C Pond (C7C.2)	<p><b>Weekly:</b></p> <p>Visually inspect and maintain freeboard where required (See BADCT – Section 4.1)</p> <p><b>Monthly and after 2”-24hour rain event:</b></p> <p>Check for any evidence of:</p> <ul style="list-style-type: none"> <li>- Impairment of embankment integrity;</li> <li>- excessive erosion in conveyances and diversions;</li> <li>- accumulation of debris in conveyances and diversions;</li> <li>- impairment of access; and</li> <li>- for facilities equipped with pumps: inspect pumps and structures for pump operation and structural integrity.</li> </ul>

<p style="text-align: center;"><b>TABLE 4.2.3</b> <b>SUB AREA C</b> <b>REQUIRED INSPECTIONS AND OPERATIONAL MONITORING</b></p>	
<b>Facility Name (#)</b>	<b>Operational Requirements</b>
7B Dam (C7B.1)  Upper Slimes (PLS) Pond (C3)  Middle Slimes Dam (C3.2)  Middle Slimes Pond (C3.2b)  Lower Slimes Dam (C11)  7C Dam (C7C.1)  7D Dam (C7D.1)  Stacker Dam (C12)	
<b><u>Lined</u> Process Solution Impoundments within the Hydrologic Influence of the Retention Basin – Non-passive Containment (Ponds, Sumps, Impoundments and Associated Conveyance Systems; west and east sides of Mineral Creek)</b>	
Suzie D Impoundment (C31)  7E Raffinate Storage Pond (C34)  Mill Pond (C32)	<p><b>Weekly:</b> Visually inspect and maintain freeboard where required (See BADCT – Section 4.1).</p> <p><b>Monthly and after 2”-24hour rain event:</b> Check for any evidence of:</p> <ul style="list-style-type: none"> <li>- Perforated or cut or damaged liner and impairment of anchor trench integrity;</li> <li>- impairment of embankment integrity;</li> <li>- excessive erosion in conveyances and diversions;</li> <li>- accumulation of debris in conveyances and diversions;</li> <li>- impairment of access; and</li> <li>- for facilities equipped with pumps: inspect pumps and structures for pump operation and structural integrity.</li> </ul>



<b>TABLE 4.2.3</b> <b>SUB AREA C</b> <b>REQUIRED INSPECTIONS AND OPERATIONAL MONITORING</b>	
<b>Facility Name (#)</b>	<b>Operational Requirements</b>
<b>Lined Process Solution Impoundments outside the Hydrologic Influence of the Retention Basin (Ponds, Sumps, Impoundments and Associated Conveyance Systems; west of Mineral Creek)</b>	
Goat Ranch Lined Pond (C20.1)	<p><b>Weekly:</b> Visually inspect and maintain freeboard where required (See BADCT – Section 4.1).</p> <p><b>Monthly and after 2”-24hour rain event:</b> Check for any evidence of:</p> <ul style="list-style-type: none"> <li>- Perforated or cut or damaged liner and impairment of anchor trench integrity;</li> <li>- impairment of embankment integrity;</li> <li>- excessive erosion in conveyances and diversions;</li> <li>- accumulation of debris in conveyances and diversions;</li> <li>- impairment of access; and</li> <li>- inspect pumps and structures for pump operation and structural integrity.</li> </ul>
<b>Miscellaneous Facilities within the Capture zone of the Retention Basin – Non-passive Containment</b>	

<p style="text-align: center;"><b>TABLE 4.2.3</b> <b>SUB AREA C</b> <b>REQUIRED INSPECTIONS AND OPERATIONAL MONITORING</b></p>	
<b>Facility Name (#)</b>	<b>Operational Requirements</b>
Big and Little Dome Ponds and Truck Wash (C1)	<p><b>Weekly:</b> Visually inspect and maintain freeboard where required (See BADCT – Section 4.1).</p> <p><b>Monthly and after 2”-24hour rain event:</b> Check for any evidence of:</p> <ul style="list-style-type: none"> <li>- Perforated or cut or damaged liner and impairment of anchor trench integrity;</li> <li>- impairment of embankment integrity;</li> <li>- excessive erosion in conveyances and diversions;</li> <li>- accumulation of debris in conveyances and diversions;</li> <li>- impairment of access; and</li> <li>- inspect pumps and structures for pump operation and structural integrity.</li> </ul> <p><b>Monthly:</b> Remove sediments/sludge from the truck wash sump as needed to maintain at least 80 percent of designed capacity.</p>
<b>Unlined Non-Stormwater Impoundments – Non-passive Containment</b>	
Retention Basin (C35)	<p><b>Weekly:</b> Check for any evidence of equipment or structural damage.</p> <p><b>Monthly and following precipitation events measuring at least 2 inches in a 24-hour period:</b> (Precipitation depth shall be based on readings obtained from the mine weather station used for such measurements) Check for any evidence of:</p> <ul style="list-style-type: none"> <li>- At pump installations, inspect pumps and structures for pump operation and structural integrity, including inspection for preventative maintenance, and</li> <li>- Check programmable logic control (PLC) on the pumping system for functional reliability.</li> </ul> <p><b>Quarterly and following precipitation events measuring at least 3-inch in a 24-hour period:</b></p>

<p style="text-align: center;"><b>TABLE 4.2.3</b> <b>SUB AREA C</b> <b>REQUIRED INSPECTIONS AND OPERATIONAL MONITORING</b></p>	
<b>Facility Name (#)</b>	<b>Operational Requirements</b>
	<p>Check for any evidence of:</p> <ul style="list-style-type: none"> <li>- Evidence of loss of functionality;</li> <li>- impairment of embankment integrity;</li> <li>- excessive erosion in conveyances and diversions;</li> <li>- accumulation of debris in conveyances and diversions; and</li> <li>- impairment of access.</li> </ul> <p><b>Annually:</b> Remove sediments/sludge from the impoundment as needed to maintain at least 80 percent of designed capacity.</p>
<b><u>Lined Process Solution Impoundments outside the Hydrologic Influence of the Retention Basin (Ponds, Sumps, Impoundments and Associated Conveyance Systems; east of Mineral Creek)</u></b>	
<p>Tailings Thickener (C37)</p> <p>Tailings Booster Station 1 Pond (C40)</p> <p>Tailings Booster Station 2 Ponds (C41)</p>	<p><b>Weekly:</b> Visually inspect and maintain freeboard where required (See BADCT – Section 4.1).</p> <p><b>Monthly and after 2”-24hour rain event:</b> Check for any evidence of:</p> <ul style="list-style-type: none"> <li>- Perforated or cut or damaged liner and impairment of anchor trench integrity;</li> <li>- impairment of embankment integrity;</li> <li>- excessive erosion in conveyances and diversions;</li> <li>- accumulation of debris in conveyances and diversions;</li> <li>- impairment of access; and</li> <li>- inspect pumps and structures for pump operation and structural integrity.</li> </ul>
<b><u>Lined Non-Stormwater Impoundments outside the Hydrologic Influence of the Retention Basin (Ponds, Sumps, Impoundments and Associated</u></b>	

TABLE 4.2.3 SUB AREA C REQUIRED INSPECTIONS AND OPERATIONAL MONITORING	
Facility Name (#)	Operational Requirements
Conveyance Systems; east of Mineral Creek)	
Seepage Collection Pond (C38)  Contact Stormwater Pond (C39)	<p><b>Weekly:</b> Visually inspect and maintain freeboard where required (See BADCT – Section 4.1).</p> <p><b>Monthly and after 2”-24hour rain event:</b> Check for any evidence of:</p> <ul style="list-style-type: none"><li>- Perforated or cut or damaged liner and impairment of anchor trench integrity (for HDPE-lined impoundments) or cracking (clay-lined impoundments);</li><li>- impairment of embankment integrity;</li><li>- excessive erosion in conveyances and diversions;</li><li>- accumulation of debris in conveyances and diversions;</li><li>- impairment of access; and</li><li>- inspect pumps and structures for pump operation and structural integrity.</li></ul>
Unlined Process Solution Impoundments – Non-passive Containment	
Elder Gulch Tailings Facility (C36)	<p><b>Weekly:</b> Check for any evidence of equipment or structural damage.</p> <p><b>Monthly and following precipitation events measuring at least 2 inches in a 24-hour period:</b> Check for any evidence of:</p> <ul style="list-style-type: none"><li>- At pump installations, inspect pumps and structures for pump operation and structural integrity, including inspection for preventative maintenance, and</li><li>- Check liner at facility toe for perforated, cut, or damaged liner and impairment of anchor trench integrity.</li></ul> <p><b>Annually:</b> Check facility height does not exceed 2,590 feet amsl.</p>
Notes: amsl - above mean sea level APP – Aquifer Protection Permit	
cm/sec – centimeters per second PLC - programmable logic control	

TABLE 4.2.3 SUB AREA C REQUIRED INSPECTIONS AND OPERATIONAL MONITORING	
Facility Name (#)	Operational Requirements
BADCT – Best Available Demonstrated Control Technology	PLS – Pregnant Leach Solution RDA – Rock Deposition Area



**TABLE 4.2.4 continued**

PARAMETER	R-4a		R-18		R-19		R-22	
	AQL	AL	AQL	AL	AQL	AL	AQL	AL
Depth to water (in feet)	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Water Level Elevation (in feet amsl)	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Field pH (S.U.)	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Field Specific Conductance (umhos/cm)	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Field Temperature (°F)	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Total Dissolved Solids	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Total Alkalinity	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Carbonate	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Bicarbonate	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Chloride	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Sulfate	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Sodium	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Potassium	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Calcium	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Magnesium	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Nitrate + Nitrite	10.0	8.4	10.0	8.0	10.0	8.0	10.0	8.0
Fluoride	4.0	3.2	4.65	None	8.60	None	8.80	None
Antimony	Res	Res	0.006	0.0048	0.006	0.0048	0.006	0.0048
Arsenic	0.05	0.04	0.05	0.04	0.05	0.04	0.05	0.04
Beryllium	Res	Res	0.004	0.0032	0.004	0.0032	0.004	0.0032
Barium	Res	Res	2.0	1.6	2.0	1.6	2.0	1.6
Cadmium	0.005	0.004	0.215	None	0.005	0.004	0.005	0.004
Chromium	0.10	0.08	0.10	0.08	0.10	0.08	0.10	0.08
Lead	0.05	0.04	0.05	0.04	0.05	0.04	0.05	0.04
Mercury	Res	Res	0.002	0.0016	0.002	0.0016	0.002	0.0016
Nickel	Res	Res	0.10	0.08	0.10	0.08	0.10	0.08
Selenium	0.05	0.04	0.05	0.04	0.05	0.04	0.05	0.04
Thallium	Res	Res	0.002	0.0016	0.002	0.0016	0.002	0.0016
Copper	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Cobalt	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Manganese	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Zinc	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor

Monitor= Analysis is required, but no AL or AQL is established in the permit.  
AQL= Aquifer Quality Limit  
AL= Alert Level

All concentrations in milligrams per liter (mg/L) except where noted.  
Metals shall be analyzed as dissolved metals.

<b>TABLE 4.2.5</b> <b>Biennial Compliance Groundwater Monitoring</b> <b>Additional Constituents</b>						
PARAMETER	R-18 AQL AL		R-19 AQL AL		R-22 AQL AL	
Adjusted Gross Alpha Particle Activity (pCi/L)	15.0	12.0	15.0	12.0	15.0	12.0
Radium 226 + Radium 228 (pCi/L)	5.0	4.0	5.0	4.0	5.0	4.0
Total Uranium (mg/L)	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
If the gross alpha particle activity is greater than the AL or AQL, then test for adjusted gross alpha particle activity. The adjusted gross alpha particle activity is the gross alpha particle activity including radium 226, minus radon and total uranium (the sum of the uranium 238, 235 and 234 isotopes).						

<b>TABLE 4.2.6</b> <b>Deposition Monitoring for Elder Gulch Tailings Facility</b>			
Sampling Point Number	Maximum Deposition Limit	Sampling Frequency	Reporting Frequency
A00554	65,400 dry tons per day	Daily Average	Quarterly



**5.0 REFERENCES AND PERTINENT INFORMATION**

The terms and conditions set forth in this permit have been developed based upon the information contained in the following, which are on file with the Department:

1. APP Application dated August 16, 2012.
2. Public Notice dated [REDACTED].
3. Public Hearing dated [REDACTED].
4. Responsiveness Summary dated [REDACTED].

## 6.0 NOTIFICATION PROVISIONS

### 6.1 Annual Registration Fees

The permittee is notified of the obligation to pay an Annual Registration Fee to ADEQ. The Annual Registration Fee is based upon the amount of daily influent or discharge of pollutants in gallons per day as established by A.R.S. § 49-242.

### 6.2 Duty to Comply

**[A.R.S. §§ 49-221 through 49-263]**

The permittee is notified of the obligation to comply with all conditions of this permit and all applicable provisions of Title 49, Chapter 2, Articles 1, 2 and 3 of the Arizona Revised Statutes, Title 18, Chapter 9, Articles 1 through 4, and Title 18, Chapter 11, Article 4 of the Arizona Administrative Code. Any permit non-compliance constitutes a violation and is grounds for an enforcement action pursuant to Title 49, Chapter 2, Article 4 or permit amendment, suspension, or revocation.

### 6.3 Duty to Provide Information

**[A.R.S. §§ 49-243(K)(2) and 49-243(K)(8)]**

The permittee shall furnish to the Director, or an authorized representative, within a time specified, any information which the Director may request to determine whether cause exists for amending or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Director, upon request, copies of records required to be kept by this permit.

### 6.4 Compliance with Aquifer Water Quality Standards

**[A.R.S. §§ 49-243(B)(2) and 49-243(B)(3)]**

The permittee shall not cause or contribute to a violation of an aquifer water quality standard at the applicable point of compliance for the facility. Where, at the time of issuance of the permit, an aquifer already exceeds an aquifer water quality standard for a pollutant, the permittee shall not discharge that pollutant so as to further degrade, at the applicable point of compliance for the facility, the water quality of any aquifer for that pollutant.

### 6.5 Technical and Financial Capability

**[A.R.S. §§ 49-243(K)(8) and 49-243(N) and A.A.C. R18-9-A202(B) and R18-9-A203(E) and (F)]**

The permittee shall have and maintain the technical and financial capability necessary to fully carry out the terms and conditions of this permit. Any bond, insurance policy, trust fund, or other financial assurance mechanism provided as a demonstration of financial capability in the permit application, pursuant to A.A.C. R18-9-A203(D), shall be in effect prior to any discharge authorized by this permit and shall remain in effect for the duration of the permit.

### 6.6 Reporting of Bankruptcy or Environmental Enforcement

**[A.A.C. R18-9-A207(C)]**

The permittee shall notify the Director within five days after the occurrence of any one of the following:

1. The filing of bankruptcy by the permittee.
2. The entry of any order or judgment not issued by the Director against the permittee for the enforcement of any environmental protection statute or rule.

### 6.7 Monitoring and Records

**[A.R.S. § 49-243(K)(8) and A.A.C. R18-9-A206]**

The permittee shall conduct any monitoring activity necessary to assure compliance with this permit, with the applicable water quality standards established pursuant to A.R.S. §§ 49-221 and 49-223 and §§ 49-241 through 49-252.

### 6.8 Inspection and Entry

**[A.R.S. §§ 41-1009, 49-203(B) and 49-243(K)(8)]**

In accordance with A.R.S. §§ 41-1009 and 49-203(B), the permittee shall allow the Director, or an authorized

representative, upon the presentation of credentials and other documents as may be required by law, to enter and inspect the facility as reasonably necessary to ensure compliance with Title 49, Chapter 2, Article 3 of the Arizona Revised Statutes, and Title 18, Chapter 9, Articles 1 through 4 of the Arizona Administrative Code and the terms and conditions of this permit.

**6.9 Duty to Modify**

**[A.R.S. § 49-243(K)(8) and A.A.C. R18-9-A211]**

The permittee shall apply for and receive a written amendment before deviating from any of the designs or operational practices specified by this permit.

**6.10 Permit Action: Amendment, Transfer, Suspension & Revocation**

**[A.R.S. §§ 49-201, 49-241 through 251, A.A.C. R18-9-A211, R18-9-A212 and R18-9-A213]**

This permit may be amended, transferred, renewed, or revoked for cause, under the rules of the Department.

The permittee shall notify the Groundwater Section in writing within 15 days after any change in the owner or operator of the facility. The notification shall state the permit number, the name of the facility, the date of property transfer, and the name, address, and phone number where the new owner or operator can be reached. The operator shall advise the new owner or operators of the terms of this permit and the need for permit transfer in accordance with the rules.

**7.0 ADDITIONAL PERMIT CONDITIONS**

**7.1 Other Information**

**[A.R.S. § 49-243(K)(8)]**

Where the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Director, the permittee shall promptly submit the correct facts or information.

**7.2 Severability**

**[A.R.S. §§ 49-201, 49-241 through 251, A.A.C. R18-9-A211, R18-9-A212 and R18-9-A213]**

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby. The filing of a request by the permittee for a permit action does not stay or suspend the effectiveness of any existing permit condition.

**7.3 Permit Transfer**

This permit may not be transferred to any other person except after notice to and approval of the transfer by the Department. No transfer shall be approved until the applicant complies with all transfer requirements as specified in A.A.C. R18-9-A212(B) and (C).